GAS JOURNAL

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COMFORT AND HEALTH WITH LESS FUEL

WE have followed, and we continue to follow, with the greatest interest the work carried out at the Building Research Station of the Department of Scientific and Industrial Research on the efficient heating of homes ("heating" including water heating, cooking, and the airing of clothes), and this means, of course, study of ventilation and air change generally. It is very easy to write "efficient and adequate heating and ventilation in the interests of health and comfort coupled with fuel economy and overall low running costs." It is a different matter to evaluate on a scientific basis the many factors which together may or may not satisfy this obvious desideratum. In the past we have been lavish and thoughtless in the use of coal in the home and we have paid the scantiest attention to such aspects as the insulation of dwellings. More coal is consumed for heating houses than for any other single purpose; the result of the expenditure of this coal is woefully inadequate. Before the war the total number of available heat units per dwelling per year in Britain was 1,500. In the U.S.A. the figure was 1,700, but in that country the home, the whole of the house, was much warmer. In Germany the figure was 880; although the consumption of heat was so much lower, German houses were at least as warm as those in Britain. We seem to delight in wasting heat up the chimney or through poorly insulated walls and roof, and remain complacent about the amount of heat carried off by cold draughts of air. The whole point is that houses should be better warmed with less expenditure of fuel, and it is wholly satisfactory that a scientific approach to the solution of this problem, on a scale hitherto unparalleled, is under way.

Two Stages

The first step in this heating investigation was to find out, under actual living conditions, how much heat is conserved by better insulation; the work is being carried out on eight specially built similar houses. In these houses the heating systems are the same while the insulation differs. These houses have now passed from the stage of being unoccupied laboratories and have been lived in by families for more than a year. The experiments continue.

For the other experiment 20 houses of identical size and similar design have been built, 16 being of the "through living-room" type and four of the "parlour living-kitchen" type. In these houses the constant factor is the thermal insulation, so that similar amounts of heat will be lost through the walls, roofs, floors, and so on, in every case. The variable factor is the method of heating. Some houses are fitted with complete central heating systems, others with devices to carry convected heat to the bedrooms; all are fitted with a combination of modern designs of solid fuel and gas and electric appliances. Last week we had the opportunity of inspecting these 20 houses in every detail and were amazed at the ambition and scope of this investigation. It is unquestionably a highly complex investigation requiring expert interpretation of the results to be obtained and the utmost collaboration in the evaluation of these results.

To-day the initial phase of the investigation starts, and for the first period the houses will be empty of tenants, but not empty of scientists. Each room of every house is fitted with thermometers of the ordinary kind and with continuous recording thermometers arranged to register at a central control room. The ventilation and the opening of doors and windows are being carefully controlled; all fuel used in each house is being carefully recorded; times of stoking or switching on and off of appliances are noted. Every gas appliance and every electric appliance has its meter; the eupathescope is in evidence; "cold spots" in the house are being noted, as is the air passage. Measurements are continuous day and night. There are two meteorological stations which give complete details of weather on the site, such as temperature, humidity, direction and force of wind and duration of sunshine. Thirty scientists and building technicians are engaged day and night, and the initial phase is expected to take three or four months or maybe a little longer. Then will come the second phase—that is, as soon as the results of the initial period are complete. At this stage tenants will move into the houses and the experiments will continue. During the first period, each house will be assumed to be occupied by an exactly similar imaginary family consisting of father, mother, and two children of school age—the mother staying at home, the father not returning for lunch. The real tenants will not, of course, follow the pattern of the imaginary "datum line" family; but the investigators, having got their figures for the theoretical family, will make allowances for size of family, hours of work, and so on, of the actual tenants in each house. It is a fundamental of the investigation that the tenants should carry on a normal life and not be influenced by the fact that their fuel consumptions are being recorded.

A Formidable Co-operative Effort

Such is the framework of this truly formidable investigation, the results of which should benefit alike architect, builder, fuel supplier, and the occupants of the houses, the while helping national economy. We are fully aware of the difficulty of the task, the difficulties which will without doubt be encountered in the endeavour to reconcile and to fit into any coherent form of pattern the hundred-and-one variables which will have to be taken into account. We realize, too, that during the course of this long-term investigation improvements

will take place in the design of fuel using appliances and the application of these in practice. Again we appreciate the cost which the investigation is bound to entail. But we regard the endeavour, in general, as worth-while and as demanding the closest support and collaboration between all the interests concerned. We know that the fullest co-operation has been extended and is being extended by the Gas Industry to the project and that this co-operation is freely acknowledged by those responsible for the outcome of this all-embracing field-research, in which the Fuel Research Station of the D.S.I.R. and the Ministry of Works, and many other scientific organizations not only in Great Britain but in other countries, notably the U.S.A., are showing their keen interest and in certain instances are giving practical help. With an inkling of the nature of the investigation we shall await the first results with patience, in the belief that much valuable data will be gained, which information will be added to as the investigation continues.

FUEL ECONOMY IN CARBONIZATION

IN the excellent and valuable Paper which he presented to the World Power Conference at The Hague, Mr. Finlayson showed commendable loyalty to the Gas Industry's choice of the Fuel Expenditure Index to express the efficiency of its carbonization processes. There is, of course, nothing wrong with it arithmetically, but it cannot be denied that it may have an unhappy psychological effect on the lay mind. The bigger the figure the less the efficiency. Why not, in general statement, claim right out that a thermal efficiency of 87% is attained in the modern gas-works?

But perhaps that will be deemed a quibble. What everyone will be interested in is the methods by which this high efficiency can be reached It is easiest, as well as of the greatest interest, to approach the question from the point of view of the continuous vertical retort. Indeed, Drs. King and Dent probably underestimated the proportion of town gas made by this process in Great Britain. Judging by plant installed it is more like 60% than the 48% given by them, and perhaps it was only modesty that led Mr. Finlayson to quote the lower figure. While, then, the fuel consumption of the retort bench in this system is already cut to 11·3, and can be cut to 10 tons of fuel per 100 tons of coal carbonized, we have still to provide fuel for power and process steam. Mr. Birks has found that the total steam requirement of works within his control amounts to from 1,220 to 1,930 lb. per ton of coal carbonized. This steam may be raised, with economy, by the utilization of low-priced breeze and by the recovery of waste heat from the settings. We may assume that 12½% of the net coke ex retort house, and after handling and screening, will pass through the debreezing mesh—that is to say, it will be too small to command a price in the open market commensurate with its fuel value. There may be as much of it as 140 lb. per ton of coal, and burnt on a suitable grate it should raise at least 700 lb. of steam. Waste heat recovery will provide another 1,000-1,100 lb., making a total of, say, 1,800 lb. of steam per ton of coal carbonized. The difficulty is that while the 700 lb. can be raised as and when required, the 1,100 lb. must be raised at a constant rate throughout the 24 hours. And Mr. Birks has told us that waste-heat steam over 500-750 lb. cannot be directly used during the night shift.

To this dilemma, however, Mr. Rimmer has provided the answer. We shall use the steam to generate electricity, at a constant rate, utilize it practically everywhere for power purposes on the works, pass the excess to the grid, and draw from the grid when we fail to have enough electricity to cover peak loads. Mr. Finlayson treats the problem of co-ordinating process steam and power requirements very nicely indeed. Taking his two suggestions together we may visualize three working pressures. Steam would be raised in the waste-heat boilers at 350-400 lb./sq. in. and passed to turbo-generators exhausting at 120 lb., at which intermediate pressure, presumably, steam would be generated from breeze. At this pressure it would be used in such units as exhausters, pumps, &c., exhausting at 25 lb. for process purposes.

Reverting to waste heat, it is recognized that this should be reduced as much as possible. There is no economy in "wasting" heat just to raise steam with it. Fuel consumption at the retort bench must be reduced to the limit of economic practicability. Settings must be designed for precision of control and avoidance of heat losses. And outgoing heat must be trapped and returned to the retort bench by way of recuperation and/or regeneration. Heat recovery may be expanded in at least two directions. First, there is Dr. Pexton's suggestion that still more of the residual heat in the coke should be recovered and used for heating the primary air to the producer, as it is already recovered for the secondary air. And then there is the possibility of devising a recuperator which might be applied to the waste gases of the continuous vertical—that is, it is still possible that by taking advantage of some of the heat-resisting alloy steels now available a really satisfactory recuperator, taking up little space, might be economically used.

Mr. Finlayson's explanation of the reason why recuperators have not so far been used with the continuous vertical is refreshing in its originality of expression. He points out that, on the one hand, the recovery of heat from waste gases requires a "gaseous carrier" in which the heat can be conveyed or to which it can be transferred; on the other hand, the continuous flow of hot coke from the retort provides a means by which secondary air can be continuously heated, a condition which is not present in the static systems. The present position is that though the heat efficiency of the non-recuperative continuous retort setting is lower than that of, say, the modern coke oven, yet because the fuel consumption per ton of coal carbonized is lower the actual fuel to producers is practically the same.

EDUCATION, RECRUITMENT, TRAINING

AS we expected, Prof. Stacey Ward's excellent Paper produced a fine crop of written contributions to the discussion. In the first place it is interesting to note that a majority of the contributors favour recruitment by way of the age-old system of apprenticeship. Not that the majority decry University education or the entry of the graduate into the Industry, but it would appear to be agreed that at any rate the bulk of recruits should enter the Industry as apprentices—apprentices with a general education at least up to School Certificate standard. It is not accepted as proved that a prior University education would improve the quality of the recruit. Mr. Castle goes so far as to say that "too much significance is attached to the possession of a University degree," which he says, "is no guarantee that the possessor will have the ability to think clearly and act accordingly, and, more important still, to be a leader in the best sense." Some questions remain to be asked and answered. Would it not be best for a degree course to be offered to selected pupils who had shown in the early years of their apprenticeship a capacity for the higher forms of education and training? One contributor pleaded for an extension of the idea of the external degree. And there remains the problem of providing educational facilities for the (geographically) isolated pupil. Mr. Bureau suggests that all students seeking admission to the Institution should be passed through "one central college of approved standard" to be set up and sponsored by the Institution—a very interesting, if somewhat Utopian, idea; while Dr. Milner pleads for far more scholarships for suitable students, with the necessity of which there will be a considerable measure of agreement. In any case, says Mr. Castle, the standard of education demanded by the present Institution Education Scheme is too low. Another very difficult problem will be raised by the incidence of the period of military training. At what point

should the gas engineering student's career by interrupted to perform this necessary duty to his country?

The metamorphosis of chemical engineer into gas engineer can only be effectively carried out in the very largest undertakings. But there is another metamorphosis of equal if not greater importance which needs to be effected—that of the little-works young man into the big-works man. It may be that when the Industry is further integrated, as it may soon be, there will be greater opportunity of giving the too highly specialized big-works pupil the incomparable all-round experience only to be obtained in the small works.

Several contributors raised the question of the paucity or poor quality of the text-books available to the student, who is "so discouraged when recommended to study certain ancient text-books." We know that this matter is being dealt with, in spite of shortage of paper and printing facilities. But the text-book must always be supplemented by the accounts of living day-to-day practice and development recorded in the Technical Press, particularly the proceedings of the Junior Associations in which students should be encouraged and expected to participate.

Mr. Gill, in a particularly lively contribution, referred to the difficulty of selection by interview. Actual experience had made him very modest about his powers as an interviewer. One of his worst failures had quite a personality and had produced three excellent testimonials. But if Mr. Gill had his failures in this direction, what is to be expected of bodies of elected persons who persist in performing this delicate and difficult function, rushing in where angels hesitate to tread? This question of personality, the incalculable, crops up often in the discussion. In education itself, even brilliant people are not always good teachers.

Mr. Gill courageousy set out the scale of payments adopted by his Company to deal with the problem of assisting parents "to give their sons a proper chance of learning our work." This is indeed a step in the right direction, but does not the scale, generous as compared with the usual nothing, need revising to meet present costs of living? How far does £50 go towards the support of a student obliged to live away from home? But this is not the only scale, based on pre-war costs, which needs revision.

Neither the discussion—already published in the "JOURNAL"—nor this comment exhausts the tale of problems which have still to be faced in the education, training, and recruitment of the gas engineers of the future.

INCREASING GAS PRICES

It is extremely satisfactory—and indicative of the close contact which the British Gas Council is maintaining, with an ever-growing measure of success, with the Ministry of Fuel and Power—that the Council's representations to the Ministry to secure relaxation of the requirement that individual application be made by gas undertakings for authorization to raise gas prices to meet present increases in coal, freight, and oil costs, less the authorized rises in the price of coke, have met with the Ministry's approval. We understand that the Ministry hopes shortly to reach a conclusion on the involved question of the measures necessary to implement its desire to assist gas undertakings by affording such relaxation. The relaxation will relate only to the present increased costs and each undertaking should raise its gas price to meet its actual increase in costs. There will not be authorization for all undertakings to increase the gas price by a fixed amount, and the price of gas supplied under individual contract can only be raised in conformity with the terms of such contract.

JOHANNESBURG'S PROGRESS

In the "JOURNAL" of Mar. 19 (page 556) we referred at some length to the birth and phenomenal development of the City of Johannesburg and its gas undertaking. The City has lately celebrated its Diamond Jubilee, and its gas undertaking is only six years younger than the town itself, having been inaugurated by a private company in 1892 and acquired by the local authority three years later. Confirmation of what we wrote about the undertaking just over six months ago is afforded by a commemorative brochure which we have now received from Mr. J. G. Curnow, Engineer and Manager, who visited this country last winter. From an initial annual output of 11½ million cu.ft., the output grew to 109½ million cu.ft. by 1928, when a complete new works was brought into operation at Cottesloe. It was well that provision was made in the design for further extension to meet a ten-fold increase in output, from 136½ millions in 1929 to 1,367 millions in 1946. It was necessary to double the original capacity in 1935 and, immediately after, in 1936, to add a further unit of equal capacity. By 1942 it was obvious that further extensions were necessary, and designs were prepared for an entirely new set of carbonizing and ancillary plant. These additions are now in course of erection, and when they are completed the Cottesloe works will be qualified to rank as one of the great gas undertakings of the world.

Commentary by "Abaris"

Slot Meters

When I last wrote about slot meters, the increase in the price of gas had not yet cropped up; now that coal has become so much more and railway rates ditto, the coin meter is going to be a problem. There are hundreds of thousands of penny meters which did their work adequately while gas was cheap. To-day anyone who depends on coppers will soon be climbing up and down the meter ladder, or hopping on and off the table, or crawling under the sink, so often as to make the insertion of coins a public nuisance.

There are two important aspects to this question: first, more pennies in the meters mean more collections and a straining of the labour involved. Second, is it possible to replace penny meters by dual coin ones? With regard to the first, the penny buys very little gas as it is, and it looks as if undertakings will have to have one or two additional collections each year. With regard to the supply of new meters, the lack of materials does not help the hard-pressed meter manufacturers, who, while performing miracles in their supplies to districts, cannot cope with a new and inflated demand of the magnitude that I think I can see.

With the present shortage of materials, it would appear to be an occasion for some genius to devise a coin box, with mechanism, which can be fitted to existing meters easily and quickly. I visualize a box that can be bolted to the side of a meter, taking shillings. I know that this part of the meter is elaborate, but the problem has arisen and we must do something about it in the public's interest, not to mention our own interest. And no one would object to a meter which, because of its dismantability, was put where it could be easily got at by the consumer and by the gas undertaking's employee.

Radiants

Soon, winter will wrap us up in that chilly, wet gloom that is so typical of our climate. Soon, customers will be entering the gas showrooms to buy replacement radiants for those that have become casualties during the summer. Gas fires are even now being dusted and got ready for the purpose of radiating a cheerful heat.

Whether the radiant supply position will be good or bad, is a matter for speculation; all we can hope for is an amelioration in the stocks. There is no worse testimonial for a decent, honest gas fire than a broken or missing radiant that mars its appearance; it is rather akin in fact, to looking at a beautiful face whose eyes squint.

Radiants can be repaired at home, and I should like to suggest that undertakings take steps to instruct the public in the method whereby repairs may be done. This is put forward in case the stocks do not come up to expectations; and I have never seen any indication in a gas showroom that radiants can be dealt with by the consumer. There were local shortages last winter which seem to have left one and all helpless.

A good fire-proof cement and much care are required in assembling the bits and pieces of the jig-saw puzzle; and a heap of patience is essential if the bits are numerous. But repairs can be done. In my own home, I have radiants that have held together for over two years and have given very satisfactory results.

A good showroom assistant, after explaining why there are so few radiants, can indicate a small display in the showroom and sell the customer a tin of cement. The method of use should be quickly demonstrated and the customer will, in all probability, go away satisfied that the gas undertaking is trying to help. This is far, far better than just saying that stocks are expected to-morrow, or next year. In this way, we try to keep the customers satisfied—and give the practical husband an evening's trickery.

Virginibus Puerisque

The St. Audrey's School at Hatfield, and the Bourne Secondary School at Ruislip have been getting a good deal of publicity in recent days, as indeed they should, for they are really excellent examples, not to mention novel examples, of school building. The children in these seats of learning should find the absorbtion of knowledge—

and punishment, if any—a pleasant and edifying process. Not for them the dingy, stuffy, evilly lighted edifices that are described glibly as schools, in most counties in this green Albion.

These two new buildings have all the modern comforts, including h. and c. on a grandiose scale and a spaciousness that will delight the eye of the most fastidious parents. Gas fired boilers heat the schools and provide the hot water for washing and cleaning. In St. Audrey's, for example, one gas boiler (1,040,000 B.Th.U. capacity per hour) heats 60 radiators in classrooms, corridors, rooms, &c. An automatic control turns this on at 7.30 in the morning, and turns it off at 3 in the afternoon; all rooms have thermostats. The hot water for washing is provided by two gas boilers with a combined capacity of 297,000 B.Th.U. per hour.

The architect found that the total cost annually was little more with gas than with solid fuels; and no account was taken of the cost of labour and ash removal. The cleanliness of gas is another important virtue. These schools were designed by Mr. Howard V. Lobb, F.R.I.B.A., and, as I said before, have attracted much attention. A third, on the same lines, is now in the course of construction at Ruislip.

Trilogy

Writing to *The Times* (issue of Sept. 26) Mr. R. H. De Saulles refers to Mr. Shinwell's idea of the nationalization of coal, electricity, and gas as a "trilogy." Mr. De Saulles points out that the Concise Oxford Dictionary defines this word as a "set of three tragedies to be performed in immediate succession."

Letter to the Editor

Our Friend "Streamlined"

DEAR SIR,—May I solicit your assistance in securing the well earned retirement of a very over-worked servant of the advertising fraternity? I refer to our worthy friend "Streamlined." Although a comparative newcomer to our vocabulary, he complains that he has been misdirected to work for which he is in no way suited. Recruited originally to describe the outline of ships or airplanes in which a conformity to the flow of streams is necessary, he has now been forced to work for some time for the makers of rectangular objects such as gas cookers and fires. He tells me that he is unaware that these appliances have yet been subjected to tests in water tanks or air tunnels to determine the validity of their claim to his services. He also informs me that he has a friend, "Cleanlined," who would be willing to take over these duties for a modest remuneration.

Yours faithfully,

A. DOUGLAS LACEY.

709, Old Kent Road, S.E.15.
Sept. 25, 1947.

Personal

Miss MARJORIE LOVELL BURGESS, a member of the London District of the Institute of Journalists, attended the recent World Power Conference at the Hague as representative of several appropriate journals, and, on Sept. 9, broadcast an account of the Conference in Women's Hour in the Light Programme.

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Miss MAYWEN GODBY, who for some time has had charge of the research kitchen at the Watson House Laboratories of the Gas Light and Coke Company, and who had the distinction of being the first woman member to present a Paper to the London and Southern Junior Gas Association last spring (on "The Woman's Point of View"), has joined the headquarters staff of the Women's Gas Council. She has previously been a member of the W.G.C. Executive Committee and has represented the W.G.C. on the Ministry of Fuel and Power Advisory Committee on Fuel Rationing since its inception. Miss Godby will act as technical adviser on all matters concerning gas and domestic science and will organize the Homecraft Courses in the future. She has a full Teacher's Diploma in Domestic Subjects and has been in the Gas Industry for many years. During the war, Miss Godby was a Factory Canteen Adviser in the Ministry of Labour and, in that capacity, also as the Organizer of Ministry of Agriculture Cookery Demonstrations in pre-war years, she has met many members of the Gas Industry up and down the country. She has plans for the organization of a second series of Homecraft Courses to follow those successfully instigated by the Women's Gas Council in the early part of the year.

Mr. T. D. OLVER, Deputy Engineer and Manager of the Burnley Gas Department, has been appointed Engineer and Manager of the Warrington Gas Department to fill the vacancy caused by the death of Mr. W. H. T. Johns. Mr. Olver received his early training with the Stockton Gas Department, leaving there to go to Burnley as Chief Engineering Assistant in 1937. In August, 1943, he was appointed Deputy Engineer and Manager in succession to Mr. J. Pollard, who became Engineer and Manager at Darwen.

Obituary

The death occurred suddenly, while on holiday, on Sept. 20 of Mr. G. W. MAHON, for 24 years Secretary of the Cleveland Gas Company.

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The death is reported of Dr. F. A. MASON, M.A., H.M.I., who had for many years represented the Ministry of Education on the Gas Education Committee of the Institution of Gas Engineers.

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The death occurred on Sept. 23 of Dr. H. T. CALVERT, M.B.E., late Chemical Inspector, Ministry of Health, and Director of Water Pollution Research, who had been for many years a member of the Liquor Effluents and Ammonia Committee of the Institution of Gas Engineers.

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The death occurred suddenly on Sept. 28, at his home, "Nutley," Elburton, Plymouth, of Mr. PERCY S. HOYTE, who served with the Plymouth and Stonehouse Gas Light and Coke Company as Chief Engineer, Consulting Engineer, and then Director since 1900. He also served on the Board of the Devon Gas Association. Mr. Hoyte was President of the Southern Association of Gas Engineers and Managers in 1923, and until recently was Chairman of the Federation of Gas Employers (South-Western Area), and a member of the Joint Industrial Council for the Gas Industry.

Diary

Oct. 2.—Solid Smokeless Fuels Federation: Executive Committee. Dorchester Hotel, Park Lane, W.1., 11.30 a.m.

Oct. 3.—North of England Gas Managers' Association: Autumn General Meeting, Carlisle, County and Station Hotel, 11.15 a.m.

Oct. 7.—Midland Junior Gas Association: Opening Meeting. Presidential Address, S. Brockbank. Birmingham Gas Department, 6.30 p.m.

Oct. 8.—Society of British Gas Industries Golfing Circle: Autumn Meeting and Annual General Meeting, Richmond Golf Club, Sudbrook Park, Petersham, 10 a.m.

Oct. 11.—Scottish Junior Gas Association (Western District): Visit to Tradeston works of Glasgow Gas Department.

Oct. 12.—Midland Junior Gas Association: Joint Meeting with Wolverhampton and District Engineering Society. Address on "Fuel," Sir Ernest Smith, C.B.E., D.Sc., F.I.C. Wolverhampton and Staffordshire Technical College, Wolverhampton, 7.30 p.m.

Oct. 14.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 10 a.m.

Oct. 14.—Illuminating Engineering Society: Opening Sessional Meeting. Presidential Address, Dr. J. W. T. Walsh. School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1.

Oct. 14.—Wales and Monmouthshire Junior Gas Association: Meeting at Treforest. Presidential Address of D. J. Rowlands. Visit to Upper Boat Power Station of the South Wales Power Company.

Oct. 16.—Institute of Fuel: Melchett Lecture by Major Kenneth Gordon, C.B.E., "Hydrogenation in the Fuel and Chemical Industries." Gas Industry House, 2.30 p.m.

Oct. 17.—Scottish Junior Gas Association (Western District): Royal Technical College, Glasgow, 5 p.m. Presidential Address of D. M. Rowan.

Oct. 18.—Manchester and District Junior Gas Association: Visit to Distribution Control Room and Garston works of the Liverpool Gas Company. Meeting at Radiant House. Presidential Address of F. Bell.

Oct. 20.—London and Counties Coke Association: Annual Luncheon 1 for 1.15 p.m.; Annual General Meeting, 2.45 p.m. Grosvenor House, Park Lane, W.1.

Oct. 21.—Southern Association of Gas Engineers and Managers (Eastern District): "An Informal Talk on the Kent Coalfield," G. le B. Diamond. Gas Industry House, 2.30 p.m.

Oct. 24.—London and Southern Junior Gas Association: Meeting, Gas Industry House. Paper by H. R. Hart on "District Work Planning."

Oct. 25.—Yorkshire Junior Gas Association: Annual General Meeting, Royal Victoria Hotel, Sheffield, 2.30 p.m.

News in Brief

The Grey (Discussion) Edition of Communication No. 306/131 of the Institution of Gas Engineers is now available from the Institution, 1, Grosvenor Place, S.W.1, price 2s. 6d. per copy (post free).

Ascot Gas Water Heaters, Ltd., had a stand at the very successful "Country Comes to Town" Exhibition recently held in Stanley Park, Blackpool. No town gas was available in the park, but the Ascot exhibit included an instantaneous water heater operated on Calor gas.

The Autumn Meeting of the Manchester District Association of Gas Engineers will be held at the Midland Hotel, Manchester, on Oct. 31, preceded by luncheon. Mr. A. K. Collinge, Engineer of the Preston Gas Company, will present a Paper on "Four Years' Developments at Preston."

Representatives of more than 250 local authorities, leading medical authorities, scientists, and industrialists are attending the annual four-day conference of the National Smoke Abatement Society, which opens in Edinburgh to-day (Oct. 1). To conserve fuel and increase industrial efficiency are objects of a wide range of subjects to be discussed.

William Sugg & Co., Ltd., were responsible for two of the installations employed in the A.P.L.E. lighting demonstrations described in the "JOURNAL" last week (pp. 668-670), namely, the "Southport" lamp in Lord Street West, and the "8000" lamp in Westcliffe Road. Through an error in transposition the description of the "8000" lamp became separated from that of the "Southport" lamp, and the words "the same firm" therefore gave credit to the wrong firm.

Mr. J. J. Kelly, the Gas Light and Coke Company's works photographer at Beckton, has had two of his photographs accepted for the 92nd Annual Exhibition of the Royal Photographic Society of Great Britain at 16, Princes Gate, S.W.7. The subjects are the "Coal Coke Charge in a Vertical Gas Retort" and the "Charge in a Vertical Gas Retort"—both of which were reprinted with Dr. F. R. Weston's recent Paper on "The Mechanism of Carbonization in Continuous Vertical Retorts."

Preliminary Notice has been given of the 1948 Machine Tool and Engineering Exhibition, to be held at Olympia from Aug. 26 to Sept. 11. It will be largest show of machine tools, woodworking machine equipment and accessories ever staged in Great Britain. The three halls at Olympia have been taken and there will be nearly a quarter of a million square feet of exhibition. The exhibition will be international in scope. Foreign exhibits will be shown side by side with British equipment and users will be able to compare the respective merits and observe the developments that have taken place.

At the Invitation of Mr. J. G. de Voogd, Head of the Gas-Stichting in The Hague, the President and other members of the Institution of Gas Engineers visited the offices and laboratories of the Gas-Stichting during the recent World Power Conference. The Gas-Stichting is a national organization, supported by the large majority of gas undertakings in Holland. It acts in a technical/advisory capacity and, in its laboratories, carries out testing of materials and products on behalf of the smaller undertakings, as well as general development work on domestic and industrial gas appliances. In spite of considerable damage suffered during the last months of the war, the Gas-Stichting is in active operation and the members of the Institution greatly appreciated the opportunity of visiting it and hearing about its valuable work from Mr. de Voogd.

Mr. James R. Stevens, Elie, intimated last week that he had been forced by circumstances to close down the gas-works owned by him at Abernethy, between Perth and Newburgh. For two and a half years Mr. Stevens has been negotiating with Perth Town Council for the sale of the gas-works, but the Council has given as a reason for refusal to purchase the prospect of nationalization, and the unwillingness of the Ministry of Fuel and Power to give a guarantee against loss, should the Industry be taken over by the Government. The Council considered a scheme to lay pipes from Perth to Abernethy, and give the villagers the benefit of the Corporation supply, but the difficulty in obtaining priority for pipes has been the drawback. Mr. Stevens said that he had been forced to close down because of the poor quality of coal, the uncertainty of regular supplies, and the increased prices he had to pay for the coal received. For a long time the works had ceased to be an economic proposition. The supply was cut off to the village last Saturday, after due warning, and since then the 200 householders have been using paraffin lamps and candles for lighting purposes and have been cooking over open fires. The only villagers not affected are those who changed over to electricity for lighting and cooking when it became known that the gas-works were likely to close. A petition to the Ministry of Fuel and Power is under consideration.

The Autumn Meeting of the S.A.G.E.M. Golfing Society will be held on Oct. 29 (the day following the Autumn Meeting of the Southern Association of Gas Engineers and Managers) at the Royal Wimbledon Golf Club. Members who have not received notice, and members of the Association who would care to join are asked to communicate with the Hon. Secretary, Mr. L. Trewby, St. Petrooks, 65, Nightingale Road, Rickmansworth, Herts.

Many Homecraft Courses are being arranged by the Women's Gas Council between October and Christmas. Following the success of the course at Southampton in the spring, a similar course was arranged by the Southampton Gas Light and Coke Company at Winchester. The Lady Mayoress inaugurated the course on Sept. 9, and Miss Maywen Godby gave the opening lecture which dealt with kitchen planning. She also spoke about the work of the Women's Gas Council. The Mayoress opened the Homecraft Course at Swindon on Sept. 11, at which Dr. Ross, the Medical Officer of Health, gave the opening lecture.

Demonstrations on Fruit Bottling and Preserving proved so popular at Warrington recently that police assistance was necessary in controlling the large crowds. The demonstrations were given by Mrs. K. M. Norman, Cordon Bleu, Domestic Science (London), at the Warrington Gas Department's showrooms on Sept. 9, 10, and 11, by arrangement with the Liverpool Gas Development Centre. On the first afternoon, two sessions were held to accommodate the numbers who attended, and later in the week, even though an additional day was arranged, vast crowds invaded the showrooms. Mrs. Norman is re-visiting Warrington at Christmas.

1947 "JOURNAL" DIRECTORY

In order to keep the Directory information up to date, the following alterations and corrections which have been notified during the past month should be noted in the 1947 issue of the "JOURNAL" Calendar and Directory:

Page 62.—ROTHWELL (Kettering).—W. A. Woosnam, *E. and M.*
" 66.—SIDMOUTH.—J. G. Branson, *E. and M.*
" 72.—SWADLINCOTE.—J. G. Branson, *E. and M.* resigned.
" 78.—WARRINGTON.—W. H. T. Johns, *E. and M.* deceased.
" 130.—SOUTH WESTERN GAS AND WATER CORPORATION.—C. Holmes Hunt, *Ch.*, vice Bruce Ottley deceased.

NO COMPULSORY GAS RATIONING

The prohibition of the use of gas and electricity for space heating which has been in operation for five months has ended and from to-day (Oct. 1) there is to be no compulsory restriction on the domestic use of these fuels, but hundreds of local fuel economy committees up and down the country are to work out their own schemes for fuel saving and exhort the public to economize as far as possible.

The Government's decision was announced by Sir Guy Nott Bower, Deputy Secretary of the Ministry of Fuel and Power, who was accompanied by Mr. J. R. W. Alexander, General Manager of the British Gas Council, and representatives of the electricity industry, at a Press conference in London last week. After full consideration of the administrative and other difficulties involved, he said the Government had decided against cumpulsory restrictions this winter on domestic users. The summer ban on gas and electric fires would disappear, but if voluntary saving failed special prohibitions might have to be introduced.

Speaking of the coal situation, Sir Guy said that the coal stock position was much better than at the same time last year. At electric power stations there were about 5½ weeks' supplies as against just over three weeks' last year. In the case of gas-works the average stocks were about 4½ weeks' supply compared with about 2⅞ weeks' last year. That was a substantial advance in security but they were not yet up to the safety level. They hoped during the next few weeks to go further in the building up of power station and gas-works stocks, but this year they did not expect to be able to reach what in earlier years was regarded as the safety level of seven or eight weeks' supply.

The Government had explored every possible form of fuel rationing, from the Beveridge proposal of a basic house allowance with a personal allowance based on the number of people in the house, to the imposition of "disincentives" in the form of heavy—even penal—increases in charges for consumptions above a certain figure, which might have had the effect of favouring the wealthy at the expense of the rest of the community, and had decided to rely on voluntary restrictions assisted by a fuel economy campaign.

While economy in the use of gas was just as important as in the use of electricity, the main problems arose in the electrical industry owing to the gap between available plant and peak demand, a gap estimated at 2½ million kilowatts this winter. Owing to wartime restrictions the

erection and extension of generating plant had not kept pace with the increasing demand for electricity, and the gap was likely to persist for another three years. In the meantime it was to the domestic user that the Ministry had to look for economies. It was quite possible that there would be heavy load-shedding if there was a cold winter. Staggered working in industry, to come into operation in the first week in October, would help to some extent, but the problem of the peak load periods between 8 a.m. and 12 noon, and between 5 and 6 p.m. would remain.

No details were yet available as to the result of the appeal for a voluntary saving of 25% in gas and electricity consumption during the summer. Sir Guy made no claims for any marked degree of success for that campaign, for the results had been almost entirely blanketed by the hot weather. A large number of people appeared to be indifferent to such appeals. Many people did not read their meters, and did not in fact know where they were, and cared even less. If, however, people ignored the appeals that would be made by the local committees and if things went badly there would be physical failures of supply as there had been before. They could not wait until that time came and then institute a compulsory rationing scheme. He would not say whether or not any special prohibition would be introduced in the event of a sudden crisis.

The electric fire was one of the greatest problems; 2,000,000 kilowatts would be used up merely by the switching on of 1,000,000 two-bar electric fires at the same time. The increased demand for both gas and electricity was due largely to the difficulty of obtaining supplies of other fuel.

Asked what was the position with regard to domestic coal, Sir Guy said the coal merchants had received 25,000 tons more coal during the summer months than last year, but had distributed between 125,000 and 130,000 tons less, as they had been asked to put aside stocks against winter needs. It was pointed out that some coal merchants had told consumers that coal not delivered in the first half of the allocation year could not be carried forward into the second half. An official of the Ministry of Fuel and Power replied that merchants who had delivered less than 15 cwt. of coal during the summer would not be restricted to 19 cwt. to those houses in the winter. The annual total of 34 cwt. per house would be delivered, provided stocks were available, even if the householder had received only 5 cwt. during the first six months.

BRITISH COKE RESEARCH ASSOCIATION

A DELEGATION of the British Coke Research Association left on Sept. 26 to carry out an extensive investigation of all technical aspects of the Coke Oven Industry in the United States.

The delegation consists of Mr. G. A. Hebden, a member of Council of the Association and Director and General Manager of the South Yorkshire Chemical Works, Ltd., who is acting as Chairman, Dr. F. Booley, another member of Council and a Deputy Works Manager of Imperial Chemical Industries, Ltd., Mr. G. W. J. Bradley, a member of Council and the East Midlands Divisional Carbonization Officer of the National Coal Board, Mr. G. W. Lee, Director of the Association and attached to the Directorate of Coke of the Ministry of Fuel and Power, and to the Headquarters Carbonization Branch of the National Coal Board, and Mr. R. Neumann, the Coke Oven Manager of Stanton Ironworks, Ltd. Professor H. L. Riley, lately Professor of Inorganic Chemistry in the University of Durham and Director of Carbonization Research of the National Coal Board, will join the delegation at a later stage.

The investigation which the delegation is to carry out in America has been carefully planned with a view to conditions in this country and in particular with regard to the large construction programme for coke oven plant now facing the National Coal Board and the iron and steel industry. The remit to the party emphasizes the general question of design of plant, including especially oven end and door design which are matters of special interest in this country and in which connexion the Association has already carried out an intensive investigation in Great Britain. It is, however, considered to be highly necessary that the delegation should investigate for themselves the progress which has been made in America during the war years so that this information may be independently assessed before the constructional programmes in this country gain impetus. The delegation is also charged with investigating the present stage in America of the preparation and utilization of oven coke for domestic purposes. This again is a most important feature of the party's work because if the general policy enunciated in the Simon Report is to be implemented during the years ahead, larger quantities of coke suitable for domestic purposes will be required than are at present available, and it is on the coke oven and gas industries that a large proportion of the increased demand will fall.

A point of immediate interest to the iron and steel industry on which the delegation has been asked to report is the present stage of American work and opinion on the correlation of coke quality with blast furnace practice. Here again a joint panel of the British Coke Research Association and of the British Iron and Steel Research Association has been giving attention to this difficult problem, and it is considered that an exchange of views with operators and research workers in America will prove to be of great benefit. Present opinion indicates that the Americans have gone further than we have in this country in the statistical investigation of correlation factors between coke quality and blast furnace practice by the use of regressional equations, and the delegation hopes that discussions with both sides of the industry in America will be of real value in this most important matter.

Another specific subject the party have been asked to investigate is the use of test ovens in America, especially full size ovens, as it is known that the British Coke Research Association is interested in development work of this nature.

The principal coke oven constructional companies in America are participating wholeheartedly in the arrangement for the visit of the delegation and both the Koppers Company, Inc., of America, and the Wilputte Coke Oven Corporation have arranged programmes of visits so that the delegation may have an opportunity of examining a representative cross section of plant operating and building in the States. Both these American organizations have spared no effort to ensure that the delegation shall be provided with the fullest possible information on all aspects of its investigation.

The main research organization in America dealing with coal and coke is also co-operating in the arrangements for the visit of the delegation. Inspections are to be made at the Pittsburgh laboratories of the United States Bureau of Mines, at the Carnegie Institute, and the Mellon Institute. At the Bureau of Mines Dr. A. C. Feildner is arranging that the various laboratories dealing with coal and coke are to have their operations in progress as much as possible for the benefit of the group, and Dr. Fieldner and the senior members of his staff will take part in the research discussions. Dr. H. H. Lowry, of the Carnegie Institute, who is already well known to various members of the British delegation and with whom discussions on research problems of mutual interest have already taken place in this country, is placing his research facilities at the Carnegie Institute freely available for the purposes of the visit. The delegation is also to have the opportunity of exchanging views and information with the Research Group of the American Coke and Coal Chemicals Institute by courtesy of the President, Mr. B. P. Mulcahy.

It is a matter of especial gratification to Mr. Hebden and the members of his party that coke oven superintendents in the States are arranging that the delegation should meet members of their groups in Chicago and Pittsburgh. Informal discussions of this nature will prove of the greatest value to the members of the party and the emphasis placed by the Americans that these meetings shall be confined chiefly to operators will ensure that a very important aspect of the delegation's work, that of full and adequate discussion with men actually running plants, will be provided for.

The delegation intends throughout the course of its visit to engage in frank exchanges of information and knowledge. It has been arranged, for instance, that Professor Riley should deliver a Paper to the American Chemical Society in Pittsburgh on Oct. 20. The subject of Professor Riley's Paper is to be "An X-ray Study of Coal Structure," and this Paper will give a synopsis of the views developed in the Northern Coke Research Committee's laboratories during recent years. It is widely known in this country that Professor Riley has developed a special technique of X-ray investigation into the structure of coals, coke, and chars which has proved of great importance to our fundamental knowledge on this subject, and the Americans are keenly interested to be informed first-hand of these researches.

Mr. G. W. Lee, the Director of the British Coke Research Association, has also been asked to speak in America on the organization and the programme of research of the Association, as the functioning and work of the Research Association movement in this country is of special interest in America at the present time.

The visit is a logical sequence to the inspection of the coke oven industry in Germany, which took place some time ago through the instrumentality of the Department of Scientific and Industrial Research and the Ministry of Fuel and Power. It provides an opportunity for responsible members of the industry and the organizations concerned to evaluate the present state of the American coking industry and its research activity in relation to our own at a very critical period when it is so necessary that long term policy decisions, so far as this country is concerned, must be taken in the light of the fullest possible world information. It is satisfactory that the Association has been able to gather together so representative a delegation for this work.

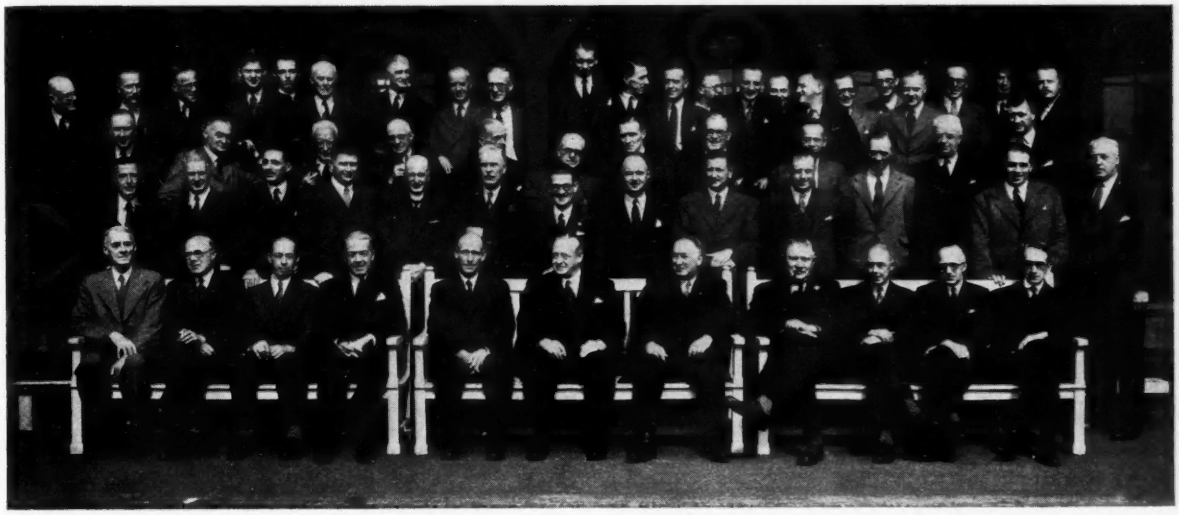
The visit of the party is being anticipated in America with considerable interest, and all concerned are combining to ensure that full facilities are available for the purpose of the visit.

MANCHESTER DISTRICT ASSOCIATION

VISIT TO STANTON IRONWORKS COMPANY, LTD.

A NOTABLE event in the history of the Manchester District Association of Gas Engineers occurred on Sept. 12, when many members, led by the President, Mr. T. R. Cook, visited the Stanton Ironworks Company, Ltd., near Nottingham. Arriving at the works at 11.30 a.m., the visitors first inspected the Training Centre. Here the 250 apprentices employed in the various works of the Company receive a carefully-planned course of training, commencing with a period of one month for talks, works visits, and practical work, and returning for two periods of one month during the next two years. The Centre is admirably equipped with an epidiascope, film projector and cinematograph and a fine technical library.

After leaving the Training Centre, the visitors were entertained to lunch by invitation of the Company.



Members of the Manchester District Association of Gas Engineers at the works of the Stanton Ironworks Company

Moving a vote of thanks to the Stanton Ironworks Company, Ltd., **Mr. T. R. Cook** said he considered himself fortunate in being able to visit the Stanton Works during his term of office as President of the Association. He commented on the fact that the Company had been in existence over a hundred years and said that the size of the works and the development of the Company showed the hall mark of private enterprise. Upon making enquiries he had found that more than 42,000 miles of Stanton spun iron pipes had been supplied to all parts of the world. Commenting on the coke oven plant (which was built in 1939 and now supplies gas to Nottingham, Derby, Long Eaton, &c.) he said the Nottingham Gas Engineer had reported very favourably on Stanton's supplies and service last year. He was of the opinion that few companies would even have thought of purifying and dehydrating the gas before delivery over long pipe lines. This was a good and useful service to the gas undertaking. After complimenting the Company on its fine new Training Centre, stressing the importance of training young persons as future craftsmen in industry, he referred to the Company's war record. Having 2,200 employees in the forces must have created a heavy strain for those of the staff and personnel who remained at home, and the erection during that time of the largest completely mechanized steel foundry in the country for the production of 500 lb. bombs was indeed a remarkable achievement.

Seconding the motion, **Mr. J. D. Ashworth** (Blackburn) said that in his long years as a gas engineer he had seen many pipes going underground, many of them Stanton pipes. For years he had looked forward to visiting the Stanton works, but this was the first time he had had the privilege, and he was sure they would all learn much from the afternoon's tour of the works.

Mr. P. H. Wilson, Deputy Managing Director, replying on behalf of the Company, said it was a great pleasure to entertain the visitors. The Gas Industry had a very great future before it. High pressure gas mains and rationalization might bring many changes in pipe lengths, joints, &c., but they would endeavour to keep abreast of progress and to anticipate demands. Referring to the new Training Centre, this in itself was an important step towards the future development of the Company. For over 28 years the Company had had its own educational system, and with this new Training Centre intended to do all it possibly could to help future craftsmen in the industry to produce still higher quality products.

Mr. A. Watson, Assistant Managing Director, supporting Mr. Wilson, said it gave him much personal pleasure to meet so many friends together. He urged the visitors to think ahead, for in doing so they would help the Stanton Company to plan for their future needs.

Planning was very much part of their work to-day, and he thought all would agree that Stanton had done a good job, especially when it was considered that at one time during the war pipe production was down to 15%. Since 1945, however, the Company had been getting back to normal, but this process had been somewhat retarded by renewal of plant and big developments which were now nearing completion. When these developments were completed their only difficulties would be supply of labour and, possibly, materials.

The guests then adjourned to the verandah to have a photograph of the group taken before commencing the tour of the works.

Of the three separate spun pipe plants, the visitors inspected the Dale plant, which deals with 4 in. and 6 in. diameter pipes.

Graded pig iron, scrap, limestone, and coke are charged to the cupolas, which produce a continuous supply of molten iron at a temperature of 1,400° C., which is run into casting ladles and conveyed to the machines in the casting shops by overhead electric telpher cranes. The pipe spinning machine consists of a water box surrounding an alloy steel mould rotating on friction rollers driven by an electric motor. The water box is mounted on an inclined bed approximately twice the length of the pipe to be produced and is traversed up and down this bed by hydraulic mechanism. At the upper end of the machine bed a tilting hopper is provided, the discharge side of which leads to a cantilever pouring trough which projects through practically the whole length of the pipe mould. Both the rate of traverse of the mould and the tilting of the hopper are controlled within very narrow limits.

The special steel mould is accurately machined so that the inside of the mould conforms to the outer profile of the pipe; an enlargement at one end of the mould is shaped to form the socket end of the pipe.

In casting a pipe, a sand core, which controls the shape of the inside of the socket end of the pipe is inserted in a tapered seat at the end of the mould remote from the tilting hopper, and the water box is moved to the top of the machine bed. The mould is then revolved and the hopper, previously filled with molten metal, is tilted at the required rate, so that a uniform stream of molten metal flows down the trough and is projected into the mould at the socket end. When the socket portion is full, the water box is traversed down the machine bed and a continuous spiral of molten metal is deposited on the inside surface of the mould. This spiral knits together into a homogeneous mass and forms the pipe.

Having inspected the testing processes, members examined the department devoted to flexible joints, and so to the concrete plant where lighting columns and railway sleepers are manufactured, and cast iron pipes receive a lining of concrete for the conveyance of liquids likely to have a deleterious effect on cast iron. Cement, sand and granite are accurately weighed and discharged into mixers, which are capable of delivering 15 tons an hour. The wet concrete is introduced

into steel moulds revolving on friction rollers, either by hand, in the case of the smaller sized pipes, or by a charging machine. The concrete is held a,nd compressed against the sides of the mould by the centrifugal force surplus water is expelled and a concrete is produced with high strength and free from voids. After spinning, the pipes are cured in a steaming chamber to accelerate setting and then stripped from the moulds.

Following the tour, the visitors returned to the Club House for tea.

Mr. **J. Corrigan** (Loughborough), moving a vote of thanks, said this seemed something like a " grace after meals " and he thanked the Stanton Company most sincerely for their generous hospitality. He felt, however, that some explanation should be made about the number of visitors present. Of some 70 acceptances, only about 50 had arrived. He thought this must be due to the serious coal situation. No doubt it had created such difficulties that many members could not leave their works to attend.

Mr. **J. G. Tilley** (Hull), seconding, said he was certain everyone had enjoyed an interesting and instructive visit. What had impressed him personally was the happy family spirit and the comfortable conditions throughout the works. The shops and buildings were clean and light, and one would scarcely think they were foundry buildings.

Many members would have liked to visit the coke oven plant, but time did not permit. However, he would like to offer a suggestion to the Association's Secretary, that the Stanton Company be asked to allow members of the Association to visit the remainder of the works on another occasion.

In his reply Mr. **A. Watson** said he was of the same opinion that many members could not attend owing to the coal situation, and added that the Company would be glad to extend an invitation to the Association to visit the remainder of the works at some future time.

THE GAS SHAREHOLDER

LEADING ARGUMENTS IN HIS CASE

(Contributed)

THE general plan of gas supply in the future appears to be settled. The present Socialist Government have declared their intention of nationalizing the Industry and the Report of the Heyworth Committee appointed by a Coalition Government must commit the other political parties to some scheme of public ownership of gas supply. In these circumstances any attempt on the part of the British Gas Council to secure the adoption of some alternative policy (*e.g.*, one based upon the Report of the British Gas Federation) would appear to be a waste of effort.

The most useful step which the B.G.C. (or at any rate its company members) could take, at this stage, is to seize the opportunity so unexpectedly presented to them by the postponement of the introduction of the Nationalization Bill and to utilize the time so gained in preparing a comprehensive statement of their views upon what would constitute equitable terms of compensation for dispossessed hareholders.

Stock Exchange quotations at some specified date or dates may or may not be an equitable basis for the acquisition of the investments of shareholders in electricity supply companies. The question is at least arguable. In the case of gas shareholders, it can, I suggest, be shown that different or greater compensation is justifiable. That they will not get it unless they claim it seems certain. So far as I am aware no such claim has been formulated, but it is surely worth making and could be convincingly stated by a committee consisting of half a dozen gas company experts. Experience has shown that the chances of altering Government policy are negligible, once that policy has been incorporated in a Bill. The case for the gas shareholder should therefore be prepared and presented with the least possible delay. The fear of appearing to acquiesce in a policy of nationalization should not deter the B.G.C. from taking every necessary precaution in preparing to meet the inevitable. The most urgent precaution is to ensure that the case for reasonable compensation for the shareholder does not go by default.

Briefly stated, the claims should be that the case of the gas shareholder can be and should be distinguished from the case of the electricity shareholder on the ground that the former is entitled to compensation on the basis of the *income* which he has been authorized and accustomed to receive from his investment and not upon the capital value of his investment as assessed by reference to some Stock Exchange quotation. The basis of the claim would be as follows:

1. Unlike electricity supply companies, gas companies were created by Statute and were controlled not merely in respect of the charges which they might make but in regard to the nature and amount of the capital which they might raise; the interest and dividends which they might pay on the various kinds of capital; the amounts which they might appropriate to reserve; and the purposes for which reserve funds might be employed.
2. Unlike the electricity supply companies, gas companies were prohibited from issuing bonus shares and capitalizing reserves, and were required to issue their authorized capital in such manner only that all money raised was in fact applied to the development of the undertaking.
3. In the case of gas companies the Statutory relationship between charges and dividends did in general constitute an effective control, whereas in the case of electricity supply companies (including those in London subject to " sliding scale " provisions) the corresponding control was quite illusory.
4. Again, unlike the majority of electricity supply companies, the gas companies were not liable (except in Scotland) to compulsory acquisition by the local authority. They were given security of tenure.

In effect, therefore, the entire financial structure of a gas company was designed by Parliament, and the principle underlying that design was that the shareholders might rely upon receiving a specified return upon a Statutorily-approved investment so long as the company was conducted within the designed framework and so long as the demand for its service persisted. It is not disputed that these two conditions are fulfilled to-day.

The dislocation caused by the First World War showed that the original design did not ensure the satisfactory working of the machinery under abnormal conditions. Parliament promptly repaired this omission by the Gas Regulation Act of 1920 which re-established the principle that investors in a properly managed Statutory gas company were entitled to receive a moderate but definite return upon their investment in the form of either fixed interest, a maximum dividend, a minimum dividend, or a dividend pivoting round a specified standard rate.

Any compensation terms which fail to take into account the fact that not only was there no element of speculation in gas investment, but that, on the contrary, Parliament had in effect assured to investors a definite return,will do less than justice to the dispossessed shareholder.

SALES MANAGEMENT AND SALESMANSHIP

The Incorporated Sales Managers' Association has issued the full results of the June examinations in sales management and salesmanship. In the final sales management examination the " Pickup Medal " for highest aggregate marks was awarded to G. O. Kenyon (Manchester). Following are details of the entries and passes:

	Entries	Passed
Market Research	257	155
Marketing	251	201
Budgetary Control	254	140
Principles and Practice of Salesmanship	211	195
Sales Organization and Control	211	166
Advertising	212	137

For the qualifying examination in sales management the details are:

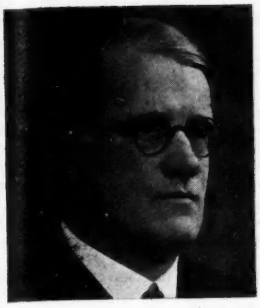
	Entries	Passed
Commerce	56	49
Economics	35	33
Business Statistics	24	10
Commercial Law	34	28
Principles of Accounts	20	9

A total of 190 candidates entered for the examination in salesmanship, of whom 155 passed.

The Education Committee has recommended that a second examination in sales management shall be held in December. The examination, for both qualifying and final stages, will be held on Dec. 4, 5, and 6, in centres which will be determined by the number of entries. Entry forms are now available from the Secretary of the Association at 23, Bedford Square, London, W.C.1, and must be returned by Oct. 31.

Principals have been asked to bring this notice to the attention of interested students, particularly those who may have failed in one or more subjects in the June examination. The examination in salesmanship will *not* be held in December.

A Homecraft Course, comprising 10 weekly sessions of lectures, demonstrations, and supporting films, arranged by the Stretford and District Gas Board, is attracting large and interested audiences at the Stretford showrooms.



FUEL ECONOMY IN COAL CARBONIZATION*

By T. C. FINLAYSON, M.Sc.,

Technical Director, the Woodall-Duckham Company

IN 1945 approximately 41,000,000 tons† of coal were subjected to high temperature carbonization in Great Britain. The Gas Industry was responsible for carbonizing 21,000,000 tons and the coke oven industry treated 20,000,000 tons. This total figure of 41,000,000 tons represents 23% of the coal raised in Great Britain during that year.

The producer fuel or gas used in providing the heat for the carbonization of this coal was equivalent to approximately 6,000,000 tons of coal and consequently a 10% reduction in the fuel used for carrying out the carbonization process would release over 500,000 tons of fuel for industry.

During the last few years a concerted effort has been made by the carbonization industries in the direction of fuel economy.

There is to-day much closer co-ordination between the official fuel authorities, gas undertakings and coke oven plants, and plant constructional companies than there was a few years ago. This tendency to share technical information has been exemplified by the setting up of the Regional Gas Engineering Advisory Boards in the Gas Industry and the Fuel Efficiency Committee in the coking industry. The Fuel Efficiency Committee of the Ministry of Fuel and Power has also done very valuable work in the general question of fuel efficiency. The work of these various committees has been published and the study of the question of fuel economy in industry has been enriched by two series of Papers and Discussions organized over two sessions by the Institute of Fuel, the first series of Papers being on the subject of thermal insulation—which covered the general question of prevention of heat loss by convection and radiation—and the second series of Papers covered the question of industrial waste heat recovery. The Fuel Efficiency Committee of the Ministry of Fuel and Power also organized an important conference on " Fuel and the Future," which was held in London in October, 1946.

From the viewpoint of the Gas Industry mention must be made of an outstanding contribution by Dr. S. Pexton,[1] presented in 1943, on the fuel requirements of carbonizing plants. The importance of the Paper lay in the fact that it placed on record the results of careful investigation of the fuel requirements of continuous vertical retorts, horizontal retorts, intermittent vertical retorts and coke ovens, all operating under the same control. Improvements in design aimed to secure economy of fuel consumption were thus assessed under comparable conditions.

Fuel Expenditure Index (F.E.I.)

In 1942, the serious coal situation, coupled with an ever-increasing industrial demand for gas, necessitated a national campaign for fuel economy in the Gas Industry of Great Britain. As part of this campaign it was desired to focus the attention of gas engineers and their staffs on the importance of fuel saving in the process of gas production, and with this in mind the Gas Directorate of the Ministry of Fuel and Power, under Dr. (now Sir) E. W. Smith, evolved the simple but effective expedient of the Fuel Expenditure Index, which expresses the fuel economy of a works as a numeral.

From 100 heat units of coal carbonized are deducted the sum of the heat units in the products (gas, coke, tar and benzole) and the difference is a figure representing the heat expended and lost in the process of carbonization. This is termed the Fuel Expenditure Index. Or expressed as a formula:

$$\text{F.E.I.} = 100 - \frac{(\text{Therms in gas} + \text{coke} + \text{tar} + \text{benzole}) \times 100}{\text{Therms in coal}}$$

Obviously this calculation is open to many corrections and refinements, but its very simplicity made it possible for calculations to be made for all works in the country, and the effect was undoubtedly to make the Gas Industry more fuel-conscious.

At the same time the Regional Gas Engineering Advisory Boards were set up under the Institution of Gas Engineers, and these Boards, apart from their valuable work in many other directions, tabulated and reviewed the F.E.I. figures of the undertakings in their regions. Standard methods were laid down for determination of the various items which were necessary for this building up of the F.E.I. Anomalies were investigated and remedies for inefficiency were suggested.

This constant watch on performance of the various undertakings under most difficult war-time conditions undoubtedly led to substantial fuel economy. S. E. Whitehead[2] showed that, in spite of deterioration in quality of coal, difficulty in maintaining plant and shortage of labour, the F.E.I. figures remained steady. For the second half of 1944, statistics covering 93% of the coal carbonized in gas-works in Great Britain showed an average F.E.I. of 23.9 or a thermal efficiency of 76.1%. For the whole of 1945 the F.E.I. figure was 23.8. It is to be noted that the Fuel Expenditure Index covers the consumption of fuel on the whole manufacturing plant and includes such ancillary matters as power required for handling materials, steam for driving exhausters and other necessary plant.

The Fuel Expenditure Index of the carbonizing process varies according to the type of plant from 20 with a modern horizontal retort plant to 15 with a modern continuous vertical retort plant. It is also found to vary with size of works. Small works, because of the proportionately greater heat losses on the small carbonizing plant, the need for a greater percentage of standby plant, lower efficiency of pumping units and so on, usually show a higher Fuel Expenditure Index than the large works—a variation of 10 points being not unusual between a small works and a large one.

Reviewing the factors which are important in maintaining a low Fuel Expenditure Index on a gas-works, W. K. Tate[3] suggests that the continued operation of plant due for renewal or repair has a marked adverse effect. He also expresses the view that a great aid towards fuel economy is the installation of a centralized power plant from which power can be distributed preferably in the form of electricity which has been generated from steam produced in waste heat boilers and in direct-fired boilers using coke breeze and fines. Coke breeze is a most economical fuel in first cost and it is therefore highly desirable that boiler installations not only should be equipped to burn breeze but should also be of sufficient capacity to give the necessary steam output with this fuel.

Relative Fuel Economy of various forms of Carbonizing Plant

In their contribution to the Industrial Waste Heat Recovery series organized by the Institute of Fuel, Dr. J. G. King and Dr. F. J. Dent[4] state that so far as the Gas Industry is concerned there are five main types of modern gas-making plant and they give the relative importance of these types based on approximate quantity of gas made in each type in 1938.

	Percentage of total gas made
(*a*) Continuous vertical retorts	48
(*b*) Horizontal retorts	28
(*c*) Intermittent vertical retorts	12
(*d*) Coke ovens	2
(*e*) Water gas plant (from coke)	10
	100

In 1947, the figures would undoubtedly show a substantial increase in the amount of water gas. Although the percentage of the total gas made in coke ovens operated by the Gas Industry is, at the moment, quite small, a substantial quantity of this gas is purchased in bulk by the Gas Industry.

The selection of the most suitable form of high temperature carbonizing plant is dependent upon the consideration of a number of factors among which the most important are:

(*a*) The type of grading of coal to be carbonized.
(*b*) The calorific value of the gas to be made.
(*c*) The type of coke and tar desired.
(*d*) The ground space available.
(*e*) The location of the plant.
(*f*) The fuel consumption of the plant.

A discussion of these various factors would be out of place in the present contribution except to say that it has long been realized that a low fuel consumption has a substantial influence on the cost of gas production. For example, F. B. Richards[5] has shown that for continuous vertical retorts 25% more producer fuel is equivalent in cost to 77% extra retort house labour or 26% more capital expended.

In the present contribution the various systems will be considered solely from the viewpoint of fuel economy, although it must be clearly

* Paper submitted at the Fuel Economy Conference of the World Power Conference, The Hague, 1947 (and British National Committee).
† In this Paper " tons " refer to English long tons of 2,240 lb. (1,016 kg.).

[1] Pexton, S. : " GAS JOURNAL," Jan 6-Feb. 3, 1943.
[2] Whitehead, S. E. : " Fuel and the Future," Ministry of Fuel and Power Conference, Oct. 1946.
[3] Tate, W. K. : *Gas World*, April 22-29, 1944.
[4] King, J. G., and Dent, F. J. : *Journal of Institute of Fuel*, April, 1946.
[5] Richards, F. B. : " GAS JOURNAL," Oct. 31, 1934.

stated that the plant giving the greatest fuel economy is not always the most suitable for any given set of conditions.

The fuel requirements of the four systems of carbonization may be conveniently compared by means of Table I, based on Dr. Pexton's data which represent best modern practice.

The heat used in the carbonization of one ton of coal is compared for non-recuperative continuous vertical retorts, recuperative horizontal retorts, recuperative intermittent vertical retorts and regenerative coke ovens. It is seen that the heat loss in coke and crude coal gas is substantially greater in the three forms of static carbonizing plant which discharge coke red hot. Continuous vertical retorts have a fundamental advantage in heat conservation by reason of the recovery of heat from the outgoing coal gas by incoming coal and the absorption of heat from the coke by steaming and pre-heating the secondary air. This leads to the consequent discharge of coke and crude gas relatively cool.

Allowing for radiation losses, &c., whereas continuous vertical retorts use 14 therms per ton of coal, intermittent verticals and horizontal retorts use 24 therms per ton, and coke ovens approximately 20 therms per ton. This basic difference in heat used leads to the general acceptance of differing principles in design. With the static forms of carbonizing plant it is customary to provide either recuperator or regenerators to recover some of the heat from the waste combustion gases. In plants with regenerators the waste gas temperature is reduced to such an extent that there is no case for the installation of waste heat boilers.

With continuous vertical retorts the heat used is relatively small and thus it is customary to pass the waste gases direct from the setting to waste heat boilers. Although the overall heating efficiency of the carbonizing system (which may be defined as $\frac{\text{heat utilized} \times 100}{\text{heat in coke to producers}}$) is obviously lower with the non-recuperative continuous vertical retorts than with the recuperative systems, yet because of the smaller amount of heat used in the former system, the fuel to producers is practically the same for modern non-recuperative continuous vertical retorts as for modern regenerative coke ovens. In addition, with the continuous verticals it is possible to recover steam to the extent of 10 therms per ton of coal carbonized.

TABLE I.—*Comparative Fuel Requirements of Four Systems of High Temperature Carbonization*

	Non-recuperative continuous vertical retorts (slight steaming) Therms	Recuperative horizontal retorts Therms	Recuperative intermittent vertical retorts (slight steaming) Therms	Regenerative coke ovens Therms
1. Heat used per ton of coal—				
Sensible heat in hot coke ...	6.0	10.9	10.7	11.3
Crude coal gas	3.5	6.4	6.4	6.1
Radiation, &c., loss	4.6	7.1	5.6	3.1
Steam reaction	—	—	1.0	—
2. Overall heating efficiency of carbonizing system—% ...	14.1 43	24.4 60	23.7 62	20.5 64.5
3. Fuel to producers—therms per ton of coal	33	41	38	32
4. *Less* therms of waste heat steam recovered	10	5.5	5	—
5. *Net* fuel consumption allowing for steam production—therms per ton of coal	23	35.5	33	32
6. *Less* therms of steam recovered by dry cooling of coke	Nil	6.0	7.2	7.5
7. Overall *net* fuel consumption allowing for waste heat steam and dry cooling of coke—therms per ton of coal... ...	23	29.5	25.8	24.5

1 therm = 25,200 k.cal.

The quoted figures represent best modern practice which have only been attained by the joint effort of plant designer and plant operator.

Recuperation of Heat

Mention has already been made of the fact that in Great Britain it is customary to design continuous vertical retort settings without the addition of recuperators, whereas intermittent vertical retorts and horizontal retort settings are usually designed to include recuperators. The reason may be worth explaining in more detail. The recuperation of heat from waste combustion gases depends on there being a gaseous carrier in which the recovered heat can be conveyed. The usual carrier is the secondary air for the combustion system. Because of the continuous counterflow of heat between the descending hot coke inside the continuous vertical retort and the secondary air ascending through suitably disposed heating ducts around the retort, pre-heating of this secondary air is obtained without any need to use the heat from the waste combustion gases which are available at their full temperature for steam raising. In static forms of plant this continuous heat exchange between the hot coke and secondary air is not readily attainable and the secondary air is normally pre-heated in recuperators, thus reducing the heat available for steam raising.

In the case of coke ovens provided with regenerators clean cold producer gas is normally used as the heating medium on gas-works, and therefore there are two gaseous carriers in which the heat recovered from the waste combustion gases can be conveyed—the producer gas and the secondary air. Therefore the waste gases can be usefully cooled down without the need for waste heat boilers.

Heat recovery by recuperation was practised before such economy by means of waste heat boilers or reversible regenerative heating was evolved. The design of recuperators has tended to be on a rule-of-thumb basis. The importance and possibility of improved design of recuperators was emphasized by Critchley.[6] The relative advantages of heat recovery by recuperators or regenerators depends largely on the duty to be done. Critchley draws the line between recuperators and regenerators in the following way:

(1) For waste gas up to 500° C. (the limit for mild steel) everything is in favour of the recuperator unless very low friction losses are essential.
(2) For waste gas from 500-1,000° C. the merits and demerits are about balanced.
(3) For waste gas of more than 1,000° C. nearly everything is in favour of regenerators.

Waste Heat Boilers

On all modern forms of high temperature carbonizing plant, with the exception of coke ovens, for reasons given above, waste heat boilers have come to be regarded as an essential part of the equipment and have contributed materially to the improvement of fuel economy. Gregson[7] has given a clear review of the present position of the technique in this subject and calculates that the annual saving of boiler fuel in the British Gas Industry by the adoption of steam production from waste heat amounts to about 1½ million tons of solid fuel. The quantity of steam at 120 lb./sq. in. which can be raised from the waste gases from various forms of carbonizing plant is approximately as follows:

	Coal carbonized lb./ton
Non-recuperative continuous vertical retorts ..	1,000-1,100
Recuperative horizontal retorts	550- 650
Recuperative intermittent verticals	500- 600

Dry Cooling of Coke

In Table I it is shown that with static forms of carbonizing plant approximately one-third of the heat supplied in the form of producer fuel is contained in the hot coke discharged from the retorts or ovens. By the installation of dry coke cooling equipment much of the sensible heat in the coke can be recovered in the form of steam. King and Dent[4] quote the performance of a dry cooling plant working in association with a modern coke oven battery as giving 750 lb. of steam at 150 lb./sq. in. and superheated to 590° F. (310° C.) per ton of coke cooled, or approximately 560 lb. of steam per ton of coal carbonized.

Pearson[8] has shown that under favourable circumstances and with a dry cooling plant arranged with economizers as much as 1,000 lb. of steam at 175 lb./sq. in. can be raised per ton of coke cooled.

The heat contained in the hot coke from intermittent vertical retorts and horizontal retorts is sufficient to raise respectively about 540 lb. and 450 lb. steam per ton of coal carbonized.

Fuel economy by dry coke cooling is not attained without some disadvantages, in particular a substantial increase in capital cost, an appreciable running maintenance cost (due to the abrasive action of fine coke), and a limitation in the permissible volatile content of the coke made.

The overall effect of waste heat recovery from spent combustion gases and from hot coke in the form of steam is shown in items 4, 5, 6, and 7 of Table I.

The Co-ordination of Process Steam and Power Requirements on Gas-Works

Gas production by high temperature carbonization of coal should be looked at as a chemical manufacturing process. In the input side the two most important ingredients are coal and steam. One of the most promising directions for further fuel economy in coal carbonization is by the proper co-ordination of the process steam and power requirements of the works. Again, by way of illustration, it is convenient to consider the case of gas manufacture in continuous vertical retorts. Process steam is required for steaming the retorts, for saturating the producer blast, for ammonia stills and liquor-concentrating plant and for other works. All this steam can be at low pressure. In the past the usual practice has been to generate the steam at about 120 lb. sq. in. in waste heat boilers and use some of this steam directly for process work after passing through reducing valves.

The quantity of process steam required varies according to the calorific value of the gas to be made; that is to say, upon the amount required for steaming the retorts. When making gas with a calorific value of 520 B.Th.U./cu.ft. the amount of steam required for this purpose may be 170 lb. per ton of coal, but when making gas at 450 B.Th.U./cu.ft. the amount may be 500 lb. per ton of coal.

[6] Critchley, G. N: *Journal Institute of Fuel, Bulletin*, April, 1946, and *Fuel Economy Review* (F.B.I.), 1946.
[7] Gregson, W.: *Journal Institute of Fuel*, April, 1946.
[8] Pearson, F.: *Gas World*, Feb. 1, 1947.

With continuous vertical retorts, Pexton[9] suggests that there would appear to be no real reason why the waste heat steam should not fulfil substantially the whole of the steam and power requirements of the whole works. A suitable arrangement for a works producing high calorific value gas might be as follows. The waste heat boilers would work at about 300 lb./sq. in. and the following items of plant would be fed with steam at about 200 lb./sq. in. through a steam accumulator —gas exhausters, liquor circulating pumps, boiler feed pumps and benzole plant. The steam from these items of plant (all turbine driven) would exhaust into a low pressure process steam main at 20 lb./sq. in. This low pressure process steam main would also receive exhaust steam from the turbines driving the waste heat boiler fans and the pass-out stage of a condensing turbo-generator, both of which items of plant would receive steam direct from the waste heat boilers at a pressure of 300 lb./sq. in. The low pressure steam main would serve to supply steam to retorts, producers, ammonia liquor-concentrating plant, &c. The whole of the remaining plant would be electrically operated by means of the current generated on the pass-out and condensing stages of the turbo-generator. On a works carbonizing 600 tons of coal a day, designed with such a system, the production of 25,000 lb. of steam an hour from waste heat boilers (1,000 lb. steam per ton of coal carbonized) would satisfy the process requirements of the works as a whole and would produce a continuous electrical load of 400 kWh, which is sufficient to supply even the peak load requirements.

Where more process steam is required as, for example, when producing gas of low calorific value, the arrangement for providing process steam and power would be somewhat different, but in every case the governing principles are:

(1) All steam generated in waste heat boilers should be required to do work before being used for process purposes.
(2) All steam should be produced at as high a pressure as is practicable. With the fire-tube type of boiler normally employed, pressures should not exceed 300 to 350 lb./sq. in., according to the size of boiler.
(3) Only sufficient units of plant should be steam driven to provide the low pressure process steam for the particular works—all the rest of the high pressure steam should be passed to condensing turbo-generators.

By careful consideration of design of carbonizing plant and "thermal linkage" within the works, substantial economies are still possible. Pexton suggests that the overall fuel consumption of a works carbonizing 600 tons of coal per day can be envisaged as follows, according to the type of carbonizing plant installed:

	Tons fuel per 100 tons coal per day
Non-recuperative continuous vertical retorts ..	11.3
Regenerative coke ovens	13.5
Recuperative horizontal retorts .. .. .. }	16.5
Recuperative intermittent vertical chambers .. }	

In other words, it is possible to attain under optimum working conditions on an ideal works a Fuel Expenditure Index of not much above 12.5—or a little more than half the average Fuel Expenditure Index for the gas-works of Great Britain. Expressed in a different way, if high temperature carbonization of coal on British gas-works could be carried out under ideal conditions there would be a saving of over 1½ million tons of fuel each year.

Fuel Economy in the Coking Industry

It is only during the past 20 years that fuel economy has become a matter of real significance to the coking industry. In the days when there was little demand for coke oven gas, as town gas, for industrial purposes, or on steel-works, there was little incentive to spend an increased capital sum to give an increased thermal efficiency. But during the years 1928-1938 great developments took place in the demand for coke oven gas for industry and on the steel-works, with the result that the value of this gas increased substantially. Consequently greater interest was focussed on fuel consumption of coke ovens. The coke oven industry was prepared to pay more in capital cost to attain an increased fuel economy, with the result that plant designers concentrated upon improving the design of heating systems, the size and capacity of regenerators and the prevention of heat loss by radiation.

To-day, necessity has accelerated this tendency. The shortage of coal, its high price and the demand for coke oven gas makes it essential that evey new plant shall be designed for maximum thermal efficiency.

Quite apart from new installations, much can be done to improve fuel economy on existing plants. In this connexion it should be recorded that the Fuel Efficiency Committee of the coking industry was set up in 1942 to consider fuel saving in the industry. In January, 1944, the Committee issued its first bulletin, which gave practical guidance on fuel efficiency and economy at coking plants.[10] From this bulletin a number of rules operating procedure may be deduced—each of which has a definite influence on fuel economy:

(1) The ovens should be charged to their full capacity with a coal charge uniform as regards fineness of crushing, moisture content and bulk density.
(2) The moisture content of the coal should be no more than 8%.
(3) The ovens should be operated on a regular pushing schedule, with the shortest period between discharging and charging.
(4) The supply of fuel gas and air should be so arranged that combustion is complete with minimum excess air in the waste gases.

In a consideration of the above bulletin, D. T. Barritt and the Author[11] have dealt with the general principles of oven design from the point of view of fuel economy. These principles include:

(1) The heating system must be such that, assuming the coal charged is uniform in all respects, coking is simultaneously completed along the length of the charge. If it is not, some part of the charge will be overheated and fuel gas thereby wasted, while the remainder of the charge is being carbonized
(2) The level of the top of the heating flues must be correctly located to suit the characteristics of the coal charged.
(3) The regenerators must be designed and proportioned to work at high efficiency—that is, the heat imparted to the ingoing air (and lean gas in the case of compound ovens) must be as near the theoretical as possible.

Design of Coke Oven Regenerators

The correct design of coke oven regenerators is a matter of considerable importance from the point of view of fuel economy. The Author, with A. Taylor[12] has described the result of an experimental investigation into the factors governing the design of coke oven regenerators.

The work was undertaken because existing knowledge was incomplete or did not relate to the special conditions applicable to coke ovens.

The purpose of the investigation was to find the effect and quantitative value as regards heat transfer and pressure loss of the different factors in the design of various types of regenerator fillings and to compare the relative efficiencies of selected fillings on a practical basis. In order to carry out this investigation a full-scale test regenerator was built and the effect on regenerator efficiency and heat transfer of various factors was studied in detail. The leading conclusion of this investigation was that surface area has so much more influence on the heat transfer than either the velocity or the efficiency of sweeping of the surface, that in a given regenerator chamber a filling giving the largest surface per cubic foot is considerably more efficient than any other arrangement.

As regards the design of coke oven regenerators, from the point of view of maximum fuel economy one or two observations may be of interest. In coke oven practice the working draught is normally furnished by a chimney which provides the necessary pull. The regenerators must therefore be designed in the first place so that they do not offer any appreciable back pressure and, in the second place so that they leave sufficient heat in the waste gases to provide the chimney pull. The importance of the size of a regenerator varies according to the type of fuel gas being used. With blast-furnace gas-firing, the bigger volume of waste gases makes it both more worth while from the point of view of fuel economy and more necessary to provide bigger regenerators than with coke oven gas firing.

Heat Losses from a Coke Oven Battery

The heat supplied to a coke oven battery is expended in three directions:

(1) In supplying heat for the actual carbonization of the coal.
(2) In overcoming radiation and convection losses from the battery surface.
(3) In the waste gases passing up the chimney where the heat performs the useful function of providing the necessary draught for the combustion system.

Provided that the ovens are carefully operated and are designed with regenerators of correct size, it is in the second category that there is still the greatest opportunity for fuel economy.

The most promising field for reducing losses by radiation and convection lies in the direction of better insulation of the oven top and behind the side buckstays. The development of high temperature insulating materials has enabled the plant designer in recent times to reduce heat losses from coke oven batteries and thus improve the overall fuel economy.

As in the Gas Industry, the coking industry has not taken proper advantage of modern technique of steam generation. D. T. Barritt and the Author[11] show that a substantial fuel economy can be effected on a complete new coke oven plant in which:

(1) Steam is generated at the boilers at 350 to 400 lb./sq. in. and is supplied only to the exhauster turbines.
(2) The exhauster turbines exhaust against a back pressure of, say, 120 lb./sq. in., which forms the intermediate pressure line for steam supply to pumps, oil heaters, rectification stills, &c.

[9] Report on the Conference on Industrial Waste Heat Recovery, Institute of Fuel, April, 1946.
[10] *Fuel Efficiency Bulletin*, No. 1, "Procedure for Coke-oven Plants," British Hard Coke Association.
[11] Barritt, D. T., and Finlayson, T.C.: "Fuel and the Future," Ministry of Fuel and Power, Oct., 1946.
[12] Finlayson, T. C., and Taylor, A.: *Journal Institute of Fuel*, Feb., 1946.

(3) The liquor circulating pumps are turbine driven. They draw steam from the 120 lb. medium pressure line and exhaust into the low pressure line at, say, 25 lb./sq. in. from which process steam is drawn for ammonia and benzole stills.

By this procedure the steam consumption can be reduced to not much more than 200 lb. per ton of coal coked as against the more usual figure of 400 to 500 lb. per ton.

In this contribution the Author has attempted to show that improved fuel economy in coal carbonization is dependent upon:

(1) The possession of accurate data on which to assess plant performance.

(2) A correct understanding of the inter-relation of the various forms of heat recovery—recuperation, regeneration, steam raising, and coke cooling.

(3) Greater effort in the prevention of heat loss in any form.

(4) An improved co-ordination of the process steam and power requirements of the coal carbonizing works.

PUBLIC LIGHTING AND PROTECTION OF LIFE AND PROPERTY *

By THOMAS WILKIE, F.I.E.S.

Public Lighting Engineer, Leicester

OF the original 10 people who met in Bingley Hall, Birmingham, in October, 1923, and decided to form the Association of Public Lighting Engineers I am now the sole survivor still in local government service. When I was President in 1930, our membership was very small indeed and the arrangements necessary for the Annual Conference were less difficult than they are to-day, having regard to our comparatively large numbers.

Looking back on what I said in my last Presidential Address, I find there are three points to which I feel reference might again be usefully made to-day, 17 years later. Firstly, I suggested the need for legislation which would lay upon local authorities the definite responsibility for providing efficient street lighting, instead of continuing it as a permissive service. The Association has continued to press this point many times from the platform, in its Journal, and in deputations to appropriate officials, and it will continue to do so. Too often the installation of lighting, or otherwise, and more so the standard thereof, is decided on purely financial grounds. Finance is important, but street lighting to-day is so bound up in our normal social life and in protecting life and property, that financial considerations should be viewed in their proper perspective. It is realized that if street lighting is made a legal duty, additional responsibility would fall on local authorities, but I am certain they would gladly accept this. Further, the methods of dealing with street lighting finance require to be overhauled, and this matter has been discussed at these Conferences many times in the past.

Secondly, I again refer to the desirability of street lighting being the concern of a qualified official, especially in the larger administrative areas. Cities and towns which have a separate organization can produce much evidence of its value from both economic and efficiency points of view. Notwithstanding the fact that there are many areas where street lighting is efficiently carried out by gas and electricity departments, I consider it should be completely divorced from either of these undertakings. The proposed nationalization of these industries may make this divorcement inevitable and, indeed, several local authorities are already considering the position of street lighting after the vesting date. From my personal experience (which many others can undoubtedly corroborate), I would assure local authorities that nothing can be lost, but much gained, by developing a separate lighting organization. Authorities whose administrative layout does not permit of a separate organization should at least authorize one official to specialize in street lighting and should ensure that, if at all possible, he be under the direct control of a committee (or sub-committee) which would deal solely with lighting. It is becoming more and more evident that matters affecting street lighting are worthy of more than being merely one or two items on an already overloaded agenda.

Road Safety

Thirdly, I refer to the subject of road safety. I make no apology for again referring to it, nor for the amount of time I will spend on it, but on this occasion I refer to it with mixed feelings. Uppermost is a feeling of something approaching shame, shame that in this, the twentieth century, after a world-wide upheaval which called forth skill of such a high standard as might have been thought impossible to attain, but was not, after a period of six years of self-abandonment to a discipline, wisely controlled at a very high level, after a period when the daily toll of deaths caused in this country by enemy bombs called forth universal protest; shame, I say, that to-day we tacitly confess our inability to deal effectively with the problem, and accept, in some cases with nice-sounding platitudes, the present road deaths and injuries as something unpleasant, perhaps even unpalatable, but something which, like the poor, must always be with us. In all seriousness, we, as a country, cannot afford to accept the present position and we must, at all costs and at any cost, find a solution or solutions. Much work has been, and is being, done by the Royal Society for the Prevention of Accidents, by local authorities (greatly assisted by the Ministry of Transport's grants for road safety work), and by innumerable voluntary sections of many organizations. These must be gratefully acknowledged—but still the carnage goes on.

I believe there is no single solution to the problem—too many factors are involved—but I do not believe the problem to be quite insoluble. There is a phrase which some of us roll flippantly off our tongues called "passing the buck." We all know what it means, we may even practise it—it has advantages sometimes—and that is what I feel many of us are doing in relation to road safety. Everyone is involved in some measure, be they lighting engineers, city or borough engineers, councillors, ordinary motorists or pedestrians, &c., and yet when something happens in which we are implicated, our first and immediate reaction, in many cases, is to try to place the blame on someone else. We can all instance such cases, except perhaps the victims. We must stop "passing the buck," or, if this is still to be done, it should be passed to some committee (or official) which has the necessary power and *courage* to act.

I suggest, for instance, that the appropriate Ministry should name, in every local authority, a committee (or official) in whom would be vested full authority and complete dictatorial powers to deal with all matters of road safety. The police would appear to be the most likely. It might mean that officials directly concerned—members of this Association, for example—might have to accept instructions from another official through the authorized committee. That committee might have to insist (being backed by the force of law) that pedestrians cross roads at given points, and only at given points; they might have to recommend the imposition of penalties on those who do not act on instructions; they might have to insist on the lighting of pedestrian crossings and the indicating beacons (why shouldn't they be lit anyway ?); they might have to authorize many things which have not hitherto been done. These and many other restrictions and alterations might be considered irksome and unpleasant but, weighed against the existing carnage, they would be trifling. In parenthesis, I must confess to a feeling of sympathy for the official of the authorized committee which would be charged with the necessary responsibility; his job would certainly be no sinecure. However, until something of this nature is done I cannot see much hope of success in the Road Safety Campaign. I do not believe that education nor the holding of Safety Weeks will, of themselves, provide the solution.

No public service is more concerned in road safety than lighting, and I hope the Ministry will give some thought to the suggestion (if this has not already been done). I can assure the Minister that he would receive from lighting officials their complete and wholehearted co-operation.

Restrictions not Justified

I must, as an individual official and not necessarily representing the Association, refer to the recent and existing restrictions in street lighting. Let me say quite frankly that, in my view, these restrictions are not justified by known facts and that they should be withdrawn immediately. Indeed, when I consider my remarks on road safety (the importance of which has never under any circumstances whatsoever been denied) I feel amazed that one of the most important factors can be so casually treated.

* From Presidential Address to the Association of Public Lighting Engineers, Southport, Sept. 16.

Apparently saving coal is more important than saving human life. I do not subscribe to this view, and I know your Council does not. There is nothing more important than saving human life, and quite contrary to imposing restrictions, local authorities should be encouraged to raise existing lighting standards and this is the more justified when one realizes the relatively small amount of coal involved even in full pre-war lighting. One could say quite a lot on this point but you will all no doubt make your own calculations and draw your own conclusions. Nothing is further from my mind than to say anything from this platform which may embarrass the Government or any of its Ministries, but I know of no measure, or restriction, which is more unpopular with the general public.

It is true to say that, last February, when the coal emergency became acute, criticisms were levelled at street lighting, but I am convinced that these criticisms were born of ignorance of the small amount of coal involved. This will in all probability apply to-day even with the 50% concession.

What of the future of street lighting? For over 20 years this Association at its Conferences, and assisted by manufacturers, has spread the gospel of better lighting, regardless of the illuminant. We will continue to do so, but we must confess to something of a setback when we consider the restrictions which have been imposed, and the difficulty we have had in getting going after the recent war. Apart from the restrictions themselves, which may or may not be necessary, I am perturbed somewhat that the oft-repeated reasons for good lighting are apparently ignored in this new world of difficulties.

There appears to be a growing tendency to relegate this particular public service to the imputed unimportance it held years ago, and to negative the science which has been arduously developed. There is, indeed, a growing school of thought which argues that street lighting, because of our survival during its suspension during war years and the restrictions subsequently imposed, is probably not so very necessary nowadays. I am sure not many of us would agree with that view. The cynic might say we are prejudiced witnesses; perhaps we are, but I am certain the man in the street still wants his streets lit, and lit well, and is still willing to pay for it. No, the need for street lighting to-day is even greater than before and I trust local authorities will insist on putting this service in its proper relationship with other communal services and not treat it as something which can be "axed" on the slightest pretence, justified or otherwise. We, as an Association, believe in the value of efficient street lighting and we will continue to press for it.

I would like to take this opportunity of thanking the manufacturers for the support they have given consistently to the Association. It must be admitted that their approach to the subject is less altruistic than ours, but even so, we, collectively and individually, derive great help from manufacturers. Speaking personally, some of my best friends are to be found among them, gentlemen who are so interested in the subject that they can disregard, to an almost unbelievable extent, the profit motive—a motive we might reasonably expect to find uppermost. I trust the Association's friendly relations with the manufacturers will continue and we, on our part at this Conference, must show our appreciation of their interest by visiting the installations they have erected in Southport.

The Association continues to grow in membership, but it is never likely to be as numerically large as other similar Associations. The Council is, however, doing its utmost to raise it to the status of a real professional Association. All applications for membership are considered closely and are only approved in cases where the Council feels a definite standard of efficiency and responsibility is evident. Nevertheless, this standard is something less than many of us feel is desirable. It is, however, the best than can be done at the moment and until such time as it is possible to admit to full membership only by examination. In this regard the Council will be considering a proposal regarding this in the future, perhaps the near future.

ELECTRICITY IN THE GAS INDUSTRY

The following are written contributions to the discussion on the Paper, "Electricity in the Gas Industry" presented by Mr. G. M. Rimmer, Electrical Engineer, Birmingham Gas Department, at the annual meeting of the Institution of Gas Engineers (I.G.E. Communication No. 316). An abstract of the Paper and a full report of the oral discussion have already been published in the "JOURNAL."

MR. C. R. INGHAM (Cheltenham): Mr. Rimmer points out the advantages of power generation in high pressure boilers and turbo generators coupled with the use of exhaust steam for process work. In a general way this is nothing new, but in the past there have been reasons for not adopting these practices in all except the largest works. Apart from the fact that to change over to higt pressure steam generation and electric drives would involve scrapping waste heat boilers, solid fuel boilers, and all non-electric drives, there is this vexed question of reliability. In a large proportion of works supplying between 3 and 8 million cu.ft. daily, waste heat boilers alone will not supply the load. Even if they could, it would still be necessary to install solid fuel boilers to allow for:

1. Repairs to carbonizing plant which would eliminate or reduce the output of waste heat boilers.
2. Breakdown of boiler fan turbines or motors.
3. Electric failure of auxiliaries.
4. Boiler cleaning.

It is usual, therefore, to find a number of solid fuel boilers, usually Lancashire boilers, at work. To scrap these boilers and install water tube boilers with chain grate stokers means installing units of 10,000-20,000 lb. per hour capacity as compared with about 4,000 lb. per hour capacity per unit displaced. The new units, being mechanically operated, are subject to breakdown at short notice and a spare boiler is therefore required. The cost of this spare unit will be about £25,000 on top of the cost of the other mechanical and high pressure waste heat boilers.

The Author, however, proposes something new to gas-works practice—namely, the parallelling of public supply with private generation on gas-works. This is a suggestion of first-class importance carrying with it all the advantages set out in the Paper. If this proposal is acceptable to electricity undertakings, the whole outlook is changed and the cost of standby boilers is largely eliminated.

There are, however, one or two questions which require an answer: What would happen to a gas-works electricity supply working in parallel with public supply in the event of

(*a*) Reduction in frequency or voltage due to load shedding?
(*b*) Cutting off electricity supply for the purpose of load shedding?

Reduction in Steam Demand

Mr. L. J. Clark (Gas Light and Coke Company): There is little doubt that the modernization of the steam and electrical services of the gas-works can contribute substantially towards increasing the overall thermal efficiency of the gas manufacturing process, and the ways and means of achieving this have been very clearly indicated in Mr. Rimmer's Paper. On the average gas-works the total demand for steam, expressed in therms, amounts to 4½%-6½% of the therms in the coal carbonized, and this may rise much higher on inefficient works; whereas it can be shown that by complete electrification of mechanical drives and the use of turbo generators exhausting low pressure steam for all process purposes the gross steam demand can be reduced to 3%-3½% of the thermal input of coal, and at the same time approximately one-third of the total electricity generated would be available for exporting to the electric supply industry. A noteworthy lead has been established by the Birmingham Gas Department in achieving the collaboration, which will permit parallel generation of electricity with the public supply, and it is hoped that such mutual understanding will spread on a national scale.

Many factors arise when considering the degree to which electrical generation on the gas-works is commercially expedient. It is clear that waste heat recovery should be exploited to the full and all possible electricity generated from this source, but at the same time it is much more important to see that the amount of waste heat available is an absolute minimum, since such waste heat is only obtained at the expense of good fuel supplied to the producers and may be more correctly termed "wasted heat." This implies the fullest possible use of heat recuperation from the hot coke, gaseous products, and waste gases, and a judicious use of heat insulation. When this has been done, there will be sufficient residual waste heat for raising the steam required to produce 25 Kwh. of electrical power per ton of coal carbonized, and supply all needs for process steam on a works producing gas with a calorific value of approximately 500 B.Th.U./cu.ft. If higher pressure waste heat boilers were employed—operating at 300 lb./sq. in. and 600° F.—the quantity of power generated could be raised to over 33 kWh. per ton carbonized.

On the ideal works, 25 kWh./ton of coal should more than suffice for all internal requirements, but on the majority of existing works, having less efficient power plant and incomplete heat recuperation from hot coke and gaseous products, it will be found necessary to provide supplementary power. The question then arises whether this power should be purchased from the public supply or generated from steam raised in direct fired boilers using coke breeze or dust as fuel. The use of good coke as a fuel for this purpose is definitely uneconomic and will not bear further scrutiny.

In principle, it would appear at first sight advantageous to sell all the coke breeze to the power stations, where it can be converted into electric energy at optimum efficiency, and then to purchase the supplementary electricity required on the gas-works, direct from the public mains. There are, however, other factors which should be considered and these may be set down under two headings.

A. In favour of purchased power:

(1) The generating efficiency of the power station will be greater than the average private installation on account of the larger generating units, the high pressure steam cycle employed, and superior technical control.

(2) As the power stations have to supply a large number of con-

sumers with different load characteristics, the diversity improves the collective load factor and results in a higher collective generating efficiency.

B. In favour of private generation:

(1) The capital charges incurred in the public electrical distribution system represents a substantial proportion of the selling price per unit of power, and this charge would not arise with private generation.

(2) The lack of handling charges incurred in transporting coke breeze from the gas-works to the power station.

(3) Commercial advantages accruing from the retention of a measure of control and flexibility over the breeze markets.

As would be expected, no universal conclusion can be derived from these considerations. The relative importance of each factor depends upon the location of the particular gas-works in relation to the power station, the size and load factor of the gas-works electrical requirements and the potential demands for breeze by other local industries.

In general, however, it may be said that the larger the works, and the higher the load factor, the greater is the likelihood of private generation being justified.

The Power Factor

Returning to some more detailed comments arising from Mr. Rimmer's Paper, I was surprised to find that he makes little mention of power factor and power factor correction of A.C. current. It is well known that the unit cost of delivering an A.C. supply to a power consumer depends not only upon the load factor but also upon the power factor. Low power factor increases the current required for each kW. of power demand, which means that the size and cost of generators, transformers and cables rises as the power factor falls. For this reason most electrical tariffs are based upon the consumer's demand in kVA.

The simple and robust squirrel cage induction motor, which possesses so many advantages for gas-works applications, is unfortunately a serious offender in inducing low power factor. This is primarily due to the high wattless magnetizing current required, which lowers the power factor rapidly as the load is reduced on the motor. This effect can be minimized by careful selection of the induction motor for any particular duty. In general, high speed motors offend less than low speed—*e.g.*, a machine running at 3,000 r.p.m. may have a power factor of 0.9 whereas a motor of similar horse power running at 600 r.p.m. may have a power factor of 0.65. It is also most important that the motor should not be too large for the duty and thus run at only part load. So often plant designers leave a fairly large margin of power in motors installed on heavy drives, to cover unknown contingencies, but it must be stressed that this has serious repercussions in producing low power factor and poor efficiency and should be avoided wherever possible.

The defects of poor power factor can be partially compensated by suitable corrective apparatus, which will supply the magnetizing component of current demanded by the induction motors. Such apparatus may take the form of static condensers or synchronous motors, which should be situated as close as possible to the source of inductive load and should be designed in conjunction with electrical characteristics of that load.

In speaking of the advantages accruing from parallel operation of public and private generating plants, Mr. Rimmer has stated that, should either supply fail, the protective gear will operate and leave the gas plant running on the remaining supply, without interruption. This, I feel, is an ideal which would be difficult to achieve on a large works, for in the event of the works generators being called upon to pick up their full load instantaneously, it is likely that there would be a serious drop in voltage and frequency, with risk of the whole of the load being shed.

Mr. Rimmer mentions the burning of coke dust in boilers with mechanical stokers and water cooled walls, and I would be pleased to receive some further details on the design of such boilers, as I was always under the impression that a refractory setting was necessary when burning such low volatile fuel in order to maintain high furnace temperatures which assist the ignition of this fuel.

Referring to the electrification of boosting plants, I feel that the variable speed motor will invariably give a higher overall economy than the constant speed motor, if the running load factor of the pumping plant is of the low order normally associated with such equipment. For an A.C. supply, I would like to know whether Mr. Rimmer has considered the range of variable speed A.C. motors as an alternative to the D.C. motor supplied through mercury arc rectifiers. There would be little difference in first cost, but I understand that the mercury arc rectifier gives a poor power factor at light load and this would frequently be the case when driving boosting plants.

Variable Speed Motors

Mr. **W. Morland Fox** (W. J. Jenkins & Co., Ltd.): Mr. Rimmer appears to me to hestitate to recommend variable speed A.C. motors, and I would therefore like to inform members of my Company's experience with this type of motor. When putting forward charging machines of the Jenkins De Brouwer projector type for works where alternating current only was available, we did, for many years, install A.C./D.C. rectifying plant and a variable speed D.C. motor for the projector drive. Some 10 years ago, however, we installed our first A.C. 3-phase variable speed commutator motor for this unit, and the success of this initial installation has persuaded us to follow up the practice. It is true that the motor, and particularly the controller, are more bulky than for direct current, but we have not had any criticisms or complaints from engineers, and on this basis we confidently recommend the practice. It would, I am sure, be of interest if engineers who have had the operation of such machines under their personal control could give us their first-hand experience, which, I hope, will confirm my statement.

Perhaps Mr. Rimmer would care to comment on the relative merits of A.C./D.C. rectification, plus D.C. motors, *versus* the straight A.C. commutator motor.

The Author omits from his Paper any mention of the widely adopted practice of power factor improvement in works where A.C. current is employed. I suggest that it would be of help to the Industry if he could indicate the circumstances where a static condensor, or condensors, could be installed and the circumstances where, with a fixed speed continuously running machine, a synchronous motor could be installed as the driving unit to effect this power factor current by over-excitation. My Company's factory went into this matter some time ago and the conditions were assessed to justify the installation of simple condensors, with beneficial results.

In the National Interest

Mr. **E. S. Legat** (Birmingham): Experience in many industries proves that really low generating costs can be achieved by the proper use of back pressure plant. A difficulty which has sometimes to be faced is the balancing of the heat and power demands, for, obviously, surplus exhaust steam at pressures above atmosphere cannot be blown to waste without seriously impairing efficiency. However, Mr. Rimmer, in his advocacy of running in parallel with the public supply, indicates one of the best ways in which this difficulty can be overcome. It seems reasonably safe to suggest that the future will see a greater measure of co-operation between electric supply authorities and users of independent generating plant. After all there ought to be co-operation between producers of heat energy, and the Author rightly claims that the national interests should predominate in such matters.

Mr. Rimmer calls attention to the rating of steam engines and turbines. This certainly is important, but I cannot entirely agree with his use of the term "very critical." That is too sweeping. Rating may be critical under extreme conditions, but in other cases there may be much more latitude.

In one instance recently where back pressure was high, about 100 lb./sq. in., the no-load steam consumption was estimated to be about 70% of the full load consumption. The rating of such an engine could be termed critical, and this applies more particularly in the smaller ranges of power. On the other hand, assuming a reasonably high initial pressure, say 180 or 200 lb./sq. in. and an exhaust pressure of the order of 10 or 15 lb., the no-load consumption might be only about 25% to 30% of the full load consumption. The rating of plant for such conditions would naturally be very much less critical. Incidentally, this goes to show the importance of keeping back pressure as low as possible.

The size and type of unit are other factors which affect the position. In some cases a turbine is right, in others a steam engine. Each case must be carefully considered on its own particular merits, so that the most suitable rating is determined. The rating of pass-out turbines is usually less critical than that of back pressure turbines. Their flexibility affords a wider range of efficient operation.

Finally, it is noticed that the Author makes no reference to generation by means of oil fuel engines. While it is scarcely possible to generate as cheaply with these types of plants as it is with correctly rated back pressure turbines or engines, there is sometimes a scope for them, particularly for handling peak loads when there is shortage of steam, and when no outside supply is connected.

A Job for the Specialist

Mr. **K. W. Francombe** (Whessoe, Ltd.): The important feature of Mr. Rimmer's Paper is that even a cursory study will reaveal to many gas engineers hitherto unconsidered possibilities concerning electrification. The merit of the Paper thus lies in the fact that the gas engineer will now be aware of the possibilities, and particularly of the potential fuel economies, resulting from electrification. I suggest he should not worry if he cannot fully comprehend all the details—he can take expert advice on these matters. If one thing is now evident, it is that the electrification of a gas-works is entirely a specialist's job and the gas engineer will therefore be well advised to employ a qualified and competent electrical engineer if the size of his undertaking warrants it. If it does not, he should seek specialist aid, either by employing the services of an electrical consultant, or equally effectively and possibly more cheaply, those of a reputable firm of electrical engineers. Any of the big electrical contractors will advise and tender for suitable equipment if the problem is put before them clearly. The gas engineer should therefore avail himself of the services of such specialists, but naturally in collaboration with his opposite number in the local electricity undertaking.

Clearly, changing over from some of the existing relatively inefficient arrangements to paralleling the grid supply with that generated in the works, calls for a long term plan. It may take years to complete. The important thing is to start at the beginning with the steam raising plant, and first of all to decide on an optimum steam pressure so that

any new boiler plant will operate at a high enough temperature and pressure to obtain high efficiency turbine operation and leave a sufficient pressure in the exhaust steam for process requirements. Once the standard steam pressure and temperature at the works is at a suitable level, high efficiency steam-operated prime movers can be employed in the intervening period until the time is ripe for an ever-expanding degree of electrification, whereby motors will displace the engines.

I have two small supplementary points to raise. The first is that one of the simplest and yet most useful applications of automatic control made possible by the employment of electricity is in connexion with the high pressure gasholder. It is a dreadful business to provide automatic control for gas engines, but with electric motors it can readily be arranged that an automatically selected compressor will start automatically at times of low demand and compress gas into the holder until it reaches the working pressure, or until the feeder main pressure falls owing to increasing demand, or between certain pre-arranged times, and so on. This automatic control is both cheap and foolproof, and will quickly save its initial cost in dispensing with the services of an attendant.

The other point concerns another subject which is of particular interest to me—namely, electro-detarring. These plants are now installed even at small works which may not employ the services of an electrician, despite the fact that they operate at 30,000 volts. This is a remarkable example of the employment of highly specialized electrical equipment, even on the smallest works. However, a word of warning. Do not specify flameproof electrics—it just cannot be done, as there is not a large enough market to warrant the development, and Buxton testing of such electrics. Another point is that it is much more costly to start off with H.T. A.C. which may be available from the grid than with the ordinary single-phase L.T. supply. Avoid D.C. if at all possible, as this entails the additional complication of the small high speed alternator set. Low tension single-phase A.C. either inter-phase, or phase neutral, is the best starting point for an electro-detarrer.

Electricity in the Smaller Works

Mr. G. M. Gill: The Author will doubtless focus more attention on the use of electricity in gas-works and should improve the efficiency of its use by gas engineers. It is clear that many of us have a great deal to learn in this respect. The larger gas-works are using more electricity since the supply became more reliable and cheaper. This tendency is bound to grow, as few of us nowadays wish to generate our own current. Ideas have changed in this respect and not only because the current is cheaper but also because it is more reliable.

In the Severn Valley and Gas Consolidation group we have found that great advantage has been experienced in the smaller works where power requirements have been electrified. In these cases the advantage is considerable, as thereby the expensive and inefficient steam boiler which has had to be in operation for 24 hours a day and seven days a week can be put out of use, with the result that more coke can be sold and less wasted. I can recommend managers of all sizes of works, and particularly of the smaller ones, to look into this question, as there is much economy to be gained by the electrification of their works, not only in the direction of power but also by the use of electric lighting for dirty or dangerous buildings such as retort, purifier, and governor houses. Such ideas would have been embarrassing to a gas engineer 30 years ago, but we are now living in a realistic world and have to face facts.

A Mistaken Belief

Mr. J. Castle (Leyland-Ormskirk Group of Gas Companies): This Paper is based on large works practice, and while much of its contents are relative to smaller and medium sized undertakings, particularly the plea for more extended use of electricity on gas-works, I feel that the remarks on private generation call for some comment. A case has been made out for works generation largely on the basis of parallel supply, which, of course, guarantees almost 100% load factor for the works generator. The Author does not indicate what he considers to be the minimum size of generator likely to be acceptable for use with parallel supply. I suggest that all works having a demand of less than 100 kW would be excluded from the advantages of parallel supply. I should like to consider for a moment a works whose peak requirements of electricity are less than 100k W—undertakings with an output of from 200 to 350 million cu.ft. per annum. In a great many instances private generation is practised and the public supply is excluded. Often the generators are steam driven and it is assumed that electricity is being produced at less than the price offered by the public supply authority.

This belief arises mainly out of three erroneous assumptions:

(1) That there is a plentiful supply of low grade fuel—namely, breeze.

(2) That steam consumption on the engine used for driving the generator is in the region of 20 lb. b.h.p. per hour.

(3) That the total steam demand is proportionate to the electricity produced.

Without waste heat recovery (a position obtaining on many horizontal carbonizing plants) the breeze available is only sufficient to produce 50% of the steam required for normal gas-works needs, such as exhausters, pumps, and washers, and it is necessary to augment this supply of breeze with saleable coke. The type of steam raising plant used and the manner in which it is operated is such that the working efficiency is of the order of 35%-45%, and after allowing for all charges, the cost of steam on the type of works mentioned varies from 5s. to 6s. 6d. per 1,000 lb. If electricity generation is to be practised, further high grade fuel will have to be fired to the boilers in order to produce sufficient steam for the generator engine.

As to the steam consumption of the generating plant, this is likely to be of the order of 60 lb./b.h.p. per hour, due largely to the very bad load factor of the electrical equipment. The load factor of equipment used in a horizontal retort house very often varies from as low as 6% to 10%.

Taking these facts into consideration, the cost of home produced electricity on the type of works envisaged (and there are many such) must be of the order of 2s. 6d. per unit. That such conditions do occur, is borne out by the following instance experienced by the writer:

A gas-works producing 250 million cu.ft. per annum on horizontal retorts was using steam driven generating plant to provide electricity for retort house equipment, comprising coal breaker, elevator and conveyor, combined charging/discharging machine, electrically operated telpher. The average daily consumption of electricity was 60 units. It was decided to take advantage of public supply through a mercury arc rectifier. The cessation of home generated electricity was responsible for the shutting down of a Cornish and Cochran boiler, with a saving of 3 tons of coke per day. With coke at 50s. per ton, the cost of fuel alone for electricity generation amounted to 2s. 6d. per unit. In my opinion there are no grounds at all for works generation of electricity on small and medium sized works where a public supply is available, except in the event of breakdown of the public supply.

It is not proposed to discuss the figures given for generating costs on a large works, beyond stating that costing on the basis of sharing expenses between process and power plant is a thorny subject on which widely divergent views are held.

I share the enthusiasm of the Author for extended use of electricity on gas-works. I feel that on medium sized gas-works there is a very good case for duplicate waste heat boilers, the steam produced being used to drive the exhausters, the exhaust steam of which would be used for process work. Any excess steam from the waste heat boilers could be used for driving electric generators, any shortage of electricity being made up from the public supply, instead of producing further steam in solid fuel fired boilers.

BOILING WATER ON TAP

Tea made with water direct from two Ascot RS52/1 instantaneous gas boiling water heaters was served to a party of guests of Ascot Gas Water Heaters, Ltd., at the Dorchester Hotel on Sept. 24. The boiling water heater is not new, but its production was suspended during the war years and the object of the party was to give it a new introduction and to emphasize its value in these changed times.

Tea-making is only one of the facilities offered—hurried shaves, quick cooking, and instant hot drinks at any time of the day or night, without the bother of filling the kettle, are some of the other advantages. By means of the temperature selector the housewife has at hand an immediate supply of water from cold to boiling point, and whether her requirement be cold water from the main supply or boiling water, all her needs are provided for.

With the selector set at "Boiling," the small flow necessary to open the gas valve is quickly boiled and the resultant steam formation in the boiling chamber expels some of this water down the outlet pipe allowing a ball valve to open which replaces the expelled boiling water with cold water, thus condensing the steam. The ball valve then closes and the cycle is repeated until, in a few moments, a position of equilibrium is reached, and a steady flow of boiling water at the rate of 2½ to 3 pints per minute is obtained. This method of operation ensures that the water is *always* boiling and is produced with the minimum loss of efficiency due to steam formation.

With the selector set to "Hot," the controlled flow of water is fixed at about ½ gall. per minute, at which flow a temperature rise of approximately 104° F. is obtained—*i.e.*, if the temperature of the cold water supply is 50°, it will, in its passage through the heater, rise to 154°.

With the selector set to the third point, "Warm," the flow of water by-passes the "Hot" and "Boiling" settings and is entirely controlled by the hot tap, so that a flow from ½ gall. per minute upwards is obtained, with a temperature rise proportionate to the flow. In other words, the less the tap is opened, the hotter will be the water. The standard Ascot safety devices are incorporated in the boiling water heater.

Mr. F. P. E. Stammers, Executive Director of Ascot Gas Water Heaters, Ltd., who welcomed the guests, criticized the policy of the Government in continuing the purchase tax on gas water heaters, but expressed the view that even under that handicap they were still economical.

Mrs. Lovelock, Founder and President of the British Housewives' League, voiced the thanks of the guests for an extremely interesting demonstration.

COMPANY MEETING

BOMBAY GAS COMPANY

The Ordinary General Meeting of the Bombay Gas Company was held at the registered office of the Company, Broad Street House, Old Broad Street, London, E.C.2, on Sept. 25, 1947. Sir ALEXANDER GRAY, Chairman of the Company, presided.

The SECRETARY (Mr. A. W. Hentsch) read the notice convening the meeting, and also the Auditors' Reports.

The CHAIRMAN: I think I should begin by explaining my presence here to-day as Chairman. In January, 1947, an offer for the whole of the Company's stock was received from an Indian Syndicate in Bombay. This offer was circulated and was accepted by a very substantial majority of the stockholders, with the result that the Company has passed into the control of Mr. Keshav Deo Jalan and his colleagues. The Directors resigned and the London staff ceased to be in the service of the Company.

On behalf of my colleagues in India, Mr. Jalan and Mr. Bajoria, as well as on behalf of Mr. W. L. Gordon, Mr. G. M. Brotchie, and myself, I should like to pay a tribute to the former Chairman, Mr. Stanley Jones, Sir George Evetts, and the other former Directors and officers for the great assistance they rendered during the transition stage. Our thanks are also due to our former Solicitors, Messrs. Blyth, Dutton and Co., and to Mr. Brunyate and Mr. Middleton, of Messrs. Coward, Chance and Co., Solicitors for the Indian Syndicate.

To come to the period under review—and during this period the former Board were in control—I would state that the Company functioned satisfactorily, notwithstanding disturbances during 1946 in Bombay, and it continues to function satisfactorily although conditions at present are even more serious. I refrain from quoting numerous comparative figures as these are given in considerable detail in the report and balance sheet before you. I will, however, record that our manufacturing plant and distribution system are taxed to the utmost. Irrespective of necessary extensions which are contemplated we were unable adequately to renew, to repair, and to renovate our retorts, gasholders, and other plant because it was, and in some cases still is, impossible to procure the necessary material and labour. A programme for these renewals and renovations is now in hand and after much consideration the Board have decided to allocate the very substantial sum of £84,000 as provision for deferred repairs and renewals. We have been able to do this by taking £27,000 from our renewal and contingency fund, by drawing substantially on the carry-forward, and from the profits earned.

The dividend recommended makes 6¼% tax free for the whole year and this is approximately the same rate as before after allowing for the tax adjustment. The previous distribution was 8% subject to partial tax of 5s. in the pound. We are not now permitted to pay dividends on the former Dominion relief basis.

I regret exceedingly that the General Manager and Engineer, who came home on leave in November, 1946, has broken down in health. He is under expert medical treatment; notwithstanding this a leading tropical diseases physician advises us that he cannot recommend Mr. Boulter's return to India. I place on record our appreciation of Mr. Boulter's excellent work at all times and particularly during the war and post-war period. It is probable that this strain, combined with the death of his wife in Bombay, is to some extent responsible for his illness.

Mr. A. R. Macdonald and Mr. S. E. Wright were appointed Joint Acting General Managers and they have worked with zeal and efficiency. Our thanks are due to them and to the staff in Bombay.

I will now move: "That the Report of the Directors and the Audited Statement of Accounts for the year ended Dec. 31, 1946, presented to the meeting be, and the same are hereby, received, approved and adopted."

Mr. W. L. GORDON seconded the resolution.

Mr. STANLEY H. JONES: I have pleasure in supporting the resolution.

There being no questions the resolution was put to the meeting and carried unanimously.

The CHAIRMAN: I will now move: "That a final dividend for the year ended Dec. 31, 1946, of 3½%, free of income tax, be now declared payable on and after Oct. 1, 1947, making with the interim dividend of 2¾%, free of income tax, a dividend for the year of 6¼%, tax free.

Mr. G. M. BROTCHIE seconded and the resolution was carried.

The CHAIRMAN: The next item is the re-election of the existing Directors—myself, Mr. Brotchie, Mr. Gordon, Mr. Jalan, and Mr. Bajoria. I understand that I am quite in order in moving an omnibus resolution that all the Directors should be re-elected. If any shareholder would prefer that the names should be proposed separately it will be quite in order to do so, but in the absence of any such request I will move that all the Directors be re-elected.

Mr. C. F. COCKELL seconded the resolution, which was carried.

Mr. STANLEY JONES moved: "That Messrs. Ferguson, Gilchrist and Co. be re-appointed Auditors for the ensuing year at the same remuneration as heretofore."

Sir GEORGE EVETTS seconded and the resolution was carried.

The CHAIRMAN: It is now my pleasure to propose that a vote of thanks from the stockholders assembled here in general meeting be accorded to the Acting General Managers and the staff in Bombay, and to the Secretary and staff in London.

Mr. GORDON seconded and the resolution was carried unanimously.

The SECRETARY, replying to the vote of thanks, said he would have pleasure in conveying it to his staff in London and transmitting it to Bombay.

Mr. STANLEY JONES: I wish to propose a vote of thanks to the Chairman for presiding at this meeting. Sir Alexander Gray joined the Board of the Oriental Gas Company some few years ago, and his colleagues at once recognized his great worth. It was a matter for regret at that time that he was not able to join the Board of the Bombay Company. The Bombay Company is now fortunate in having the services of Sir Alexander who, with his long experience and wide knowledge, has had a great deal to do with the change over from English to Indian control. I feel things would not have gone through so well but for his excellent service, and I congratulate him and his colleagues on the results of their efforts.

Sir GEORGE EVETTS: As one of the late Directors I should like to second the vote of thanks.

The vote of thanks was carried unanimously, and the CHAIRMAN briefly replied.

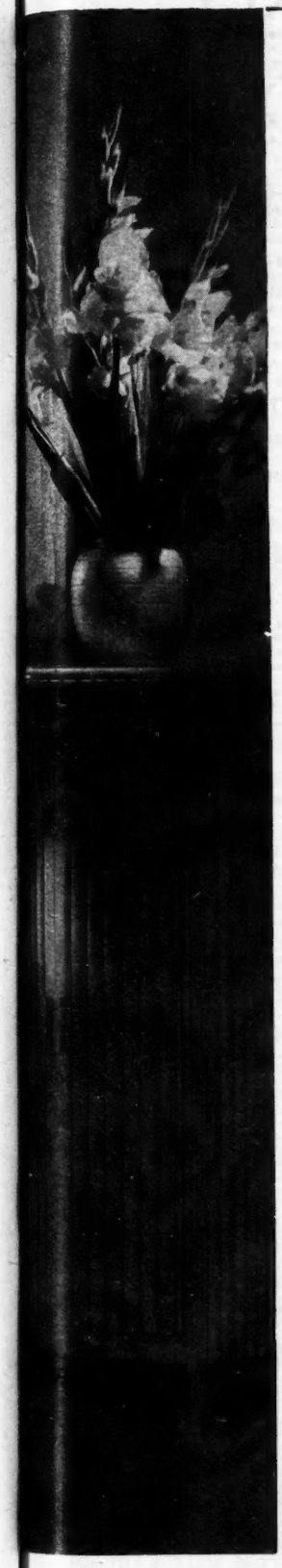
SMOKE POLLUTION

The problem of smoke which so damages and disfigures our cities is one which intimately concerns the Gas Industry, for the abolition of this curse relies to a considerable extent upon the increased use of gas as a fuel. The crusade against smoke is waged for both aesthetic and materialistic reasons; not only is it ugly, injurious, and inconvenient, it is a sign that our fast-dwindling coal stocks are announcing their wastage in a visible form. It is indeed fortunate that there exists such an institution as the National Smoke Abatement Society and that it is both energetic and, considering the magnitude of the task it has undertaken, effective. Public interest is being roused, but although the effects of smoke are suffered to a greater or lesser extent by the majority of people in this country, it seems their ill effects are accepted as a necessary and unalterable evil. Mr. Arnold Marsh puts his finger on the real difficulty when, in *Smoke*, a new book published by Faber and Faber, he writes "the smoke problem suffers, in respect of public understanding and support, because it is too big." Mr. Marsh should know, for as General Secretary and Publications Editor of the N.S.A.S., he has contributed much to the general enlightenment of the public and is an expert on the subject.

This is probably the first book on smoke pollution intended for the layman as well as for those with professional interest which embraces the subject as a whole, with adequate quotations of figures and an easily readable style. In tackling any subject it is well to begin at the beginning, but it is not a little surprising to find that Mr. Marsh finds the beginning of his story as far back as 1500 B.C. when, it is established, coal was in use as a fuel. The book reports that the ill-effects of smoke were recognized at least as far back as the 16th century, and from that date the pace quickens to carry the reader to the present time and even to the future. Here is the complete picture: the influence of smoke upon plant life, health, and many materials such as stone, metals, fabrics, &c.; its labour cost in cleaning, from public buildings to laundry and all forms of merchandise; and its gradual defeat at the hands of scientists and research workers. Both industrial and domestic aspects are closely examined, and the popular topic of district heating receives honourable mention. Pollution from road vehicles and similar sources reveal unexpected figures, and the Author concludes with a study of smoke pollution and abatement methods abroad.

Admirably produced with Appendices and a full bibliography, *Smoke* is illustrated with a host of quite exceptional photographs. It is to be hoped that it will appeal to a wide circle of readers and will contribute much to a noble and necessary cause. The book was published on Sept. 26, its price being 21s.

The North of England Gas Managers' Association will hold its Autumn General Meeting at the County and Station Hotel, Carlisle, on Oct. 3. Following an official welcome by the Mayor of Carlisle and the transaction of formal business, Mr. J. G. Aitken will deliver his Presidential Address. Members will be the guests of the President at luncheon and in the afternoon a visit will be paid to Carr's biscuit factory, after which the Mayor will entertain members to tea at the County and Station Hotel.



NEW WORLD

SILENT
BEAM

Gas Fires

PRODUCT OF RADIATION LIMITED
RADIATION HOUSE · ASTON · BIRMINGHAM 6
SHOWROOMS & LONDON OFFICE: 7, STRATFORD PLACE, W.1

GAS STOCKS AND SHARES

Total dealings on the Stock Exchange last week again showed a decrease, but conditions generally were steady. After a small decline, British funds finished the week at a higher level than for several days, and the turnover was greater. The more favourable coal stock position, the likelihood of early aid for Europe, and the weight of money available for investment contributed to an improvement in the industrial Ordinary share index, and several of the leading shares showed advances on the week, although closing prices were in most instances slightly below the best. On Thursday the Directors of Imperial Chemical Industries declared an interim dividend of 3% on account of the year ending Dec. 31 next, and the shares rose 6d. on the day to 46s. 9d.

Chief interest in the gas stock market was centred in Gas Light and Coke Ordinary, which rose 3d. on the week, Primitiva Holdings, which showed a further improvement of 1s. to 11s. 6d., and Croydon maximum dividend, which advanced five points. Transactions in gas securities were again well below the average, the total for the week ending on Thursday falling to 199, compared with well over 300 in the early part of August and 224 for the preceding week. Very satisfactory results were reported at the annual meeting of the Bombay Company, whose stock remained at 46s.-49s. ex-dividend.

The week's rises and falls were as follows:

OFFICIAL LIST

Brighton, &c., 5 p.c. std. cons.	96	—101	— 2
Do. 5 p.c. perp. deb.	108	—118	— 2
Bristol, gen. cap. 5 p.c. max. ...	98	—103	— 5
Cambridge U. & T., 5 p.c. cons. "C"	95	—100	— 3
Cape Town, 4½ p.c. cum. pref. ...	16/	—18/	— 6d.
Cardiff, cons. ord.	110	—120	— 2
Commercial, 5 p.c. irred. deb. ...	108	—118	— 2
Croydon, sliding scale	113	—118	— 2
Do. max. div.	95	—100	+ 5
Do. 5 p.c. perp. deb. ...	108	—118	— 2
East Surrey, 5 p.c. irred. deb. ...	108	—118	— 2
Gas Light & Coke, ord.	20/6	—21/6	+ 3d.
Luton, ord. "B" (xd. Sept. 17)...	105	—115	— 3
Newport (Mon.) 5 p.c. perp. deb	105	—115	— 5
Northampton, cons.	99	—104	+ 1
Plymouth & Stone, 5 p.c. perp. deb. (xd. Sept. 17)	105	—115	— 5
Primitiva Holdings, Ltd., ord. ..	10 6	—12/6	+ 1s.
Reading, 3¾ p.c. red. (non-cum.) pref.	95	—100	— 4
Uxbridge, &c. 5 p.c. perp. dep. ...	105	—115	— 5
Wandsworth, 5 p.c. irred. deb. ...	108	—118	— 2

Quotations on the London Stock Exchange

When ex-Dividend		Dividends Interest.% Last Yr.	Prev. Yr.	NAME.	Quotations Sept. 25
Sept.	3		4	Alliance & Dublin Cons. Ord.	20/6—22/6
April	30	5	5	Asscd. Gas & Water U'd'tgs Ord. ...	18/6—20/6
"		6	6	Do. Deferred	18/6—20/6
Sept.	3	—	4½	Do. 4½ p.c. Red. Cum. Pref....	18/6—20/6
"		4	4	Do. 4 p.c. Red. Cum. Pref. ...	18/6—20/6
"		4	4	Do. 4 p.c. Irred. Cum. Pref....	18/6—20/6
Aug.	20	—	7	Barnet Ord. 7 p.c. max.	150—160
Aug	6	—	5	Bath Cons. Ord .5 p.c. basic ...	95—100
Sept.	17	6½	10	Bombay, Ltd., Stock	46/—49/-xd
Sept.	3	8½	8½	Bournemouth Std. 5 p.c. sliding scale	165—175
"		7	7	Do. 7 p.c. max. div.	150—160
"		4	4	Do. 4 p.c. Pref.	94— 99
"		6	6	Do. 6 p.c. Pref.	115—125
Sept.	3	...	3½	Do. 3½ p.c. Red. Deb. ...	94— 99
June	4	4	4	Do. Perp. 4 p.c. Deb. ...	97—102
Aug.	20	—	5·55	Brighton, &c., 5 p.c. Std. Cons. ...	96—101
"		—	6·3	Do. 6 p.c. Std. Cons.	108—113
June	4	5	5	Do. 5 p.c. Perp. Deb.	108—118
Aug.	6	—	5	Bristol, Gen. Cap. 5 p.c. max. ...	98—103
June	4	...	4	Do. 4 p.c. New Deb. Red. ...	95—100
Mar.	12	7½	7½	Brit. Gas Light Ord.	117—122
June	18	...	5½	Do. 5½ p.c. 'B' Cum. Pref. ...	107—112
June	4	4	4	Do. 4 p.c. Red. Deb.	95—100
Aug.	6	—	10	Cambridge U. & T. Orig. 10 p.c. Cons. ...	180—190
"		—	5	Do. 5 p.c. Cons. 'C'	95—100
"		—	7	Do. 7 p.c. Cons. 'B.'	125—130
April	30	...	4½	Cape Town, Ltd., 4½ p.c. Cu. Pf. ...	16/—18/-
July	16	—	6½	Cardiff Con. Ord.	110—120
Aug.	6	—	5	Cheltenham, 5 p.c. basic Cons. Ord. ...	97—102
June	18	4	4	Do. 4 p.c. Perp. Deb.	95—100
Aug.	6	—	5½	Chester United Ord.	110—120
June	18	7	9½	Colombo Ltd., Ord.	39/6—41/6
"		7	7	Do. 7 p.c. Pref.	23/6—25/6
Mar.	26	...	5	Colonial Gas Assn. Ltd. Ord.	17/—19/-
"		8	8	Do. 8 p.c. Pref....	24/—26/-
Aug.	6	—	5	Commercial Ord.	80— 85
June	4	...	3	Do. 3 p.c. Deb. Perp.	75— 80
Aug.	20	5	5	Do. 5 p.c. Irred. Deb.... ...	108—118
"		—	6	Croydon sliding scale	113—118
"		—	5	D . max. div.	95—100
"		4	4	Do. 4 p.c. Irred. Pref.	92— 97
June	18	4	4	Do. 4 p.c. Perp. Deb.... ...	95—100
"		5	5	Do. 5 p.c. Perp. Deb.... ...	108—118
Aug.	20	—	8½	Derby Cons. Ord.	138—143
June	18	4	4	Do. 4 p.c. Red. Deb.	95—100
Aug.	6	—	5	East Hull Ord.	92— 97
Aug.	20	—	5	East Surrey 'B,' 5 p.c.	97—102
"		—	6	Do. 6 p.c. Cum. Pref.... ...	112—117
June	18	5	5	Do. 5 p.c. Irred. Deb.	108—118
Feb.	26	6⅝	6⅝	East Wight Cons. Ord.	110—120
Aug.	6	—	5	Eastbourne 'A'	95—100
"		—	3½	Do. 'B'	90— 95
Aug.	20	5	5	Gas Consolidation Ord. 'A'	19/6 —21/6
"		5	5	Do. Ord. 'B'	19/- —21/-
May	14	...	4	Do. 4 p.c. Red. Cum. Pref.	19/6—21/6
Aug.	6	5	5	Gas Light & Coke Ord.	20/6—21/6
"		3½	3½	Do. 3½ p.c. max.	72— 77
"		4	4	Do. 4 p.c. Con. Pref.	94— 99
July	2	3½	3½	Do. 3½ p.c. Red. Pref....	93— 98
June	4	3	3	Do. 3 p.c. Con. Deb.	81— '86
"		5	5	Do. 5 p.c. Deb.	100—105
"		4½	4½	Do. 4½ p.c. Red. Deb.	102—107
Sept.	3	3½	3½	Do. 3½ p.c. Red. Deb....	92— 97
Aug.	6	5	5	Gloucester Cons. Ord.	97—102
Feb.	12	2	Nil	Great Yarmouth (8½ p.c. max)	10 — 12½
Sept.	3	—	7½	Guildford Cons. Ord.	128—138
Aug.	20	5	5	Hampton C't, 5 p.c. Cons. Ord.	95—100
Sept.	3	—	5	Hartlepoo G. & W. 5 p.c. Ord.	96—101
June	4	6	5	Hastings & St. L. (5 p.c. Std.)	87— 92
"		5	3½	Do. (3½ p.c. Std.)	83— 88
June	18	7½	6	Holyhead & N. Wales Ord.	22/—24/-
Aug.	6	—	5	Hornsey 3½ p.c. Std.	93— 98
"		—	6 7/16	Do. 5 p.c. Std	115—120
May	14	8½	8	Imperial Continental Cap.	107—112
July	16	—	3½	Do. 3½ p.c. Red. Deb....	95—100
Aug.	20	7½	7½	Lea Bridge Co., Cons. Ord....	140—150
Aug.	6	5½	5½	Liverpool 5 p.c. Ord.	105—115
Sept.	17	—	7½	Luton Cons. Ord. 'A'	120—130xd
"		6½	6⅝	Do. Ord. 'B'	105—115xd

When ex-Dividend		Dividends Interest.% Last Yr.	Pref. Yr.	NAME.	Quotations Sept. 25
July	16	7	7	Malta & Med'n., 7 p.c. 1st Pref.	100—110
"		...	7½	Do. 7½ p.c. 2nd. Pref....	105—115
Aug.	20	5·225	5·225	M.S. Utility 'A' Cons.	97—102
"		3·722	3·722	Do. 'B' Cons.	68— 73
"		5	5	Do. 'C' Cons.	95—100
"		...	4	Do. 4 p.c. Cons. Pref.	92— 97
April	30	4	4	Montevideo, Ltd. Ord.	112—122
Aug.	6	5⅜	5⅜	Newcastle and Gateshead Ord.	22/—24/-
July	2	3½	3½	Do. 3½ p.c. Perp. Deb.	85— 90
Aug.	6	—	7	Newport (Mon.) Cons.	100—105
June	18	5	5	Do. 5 p.c. Perp. Deb....	105—115
Aug.	6	6⅜	6⅜	North Middlesex 6 p.c.	128—133
"		5	5	Do. 5 p.c. Pref.	100—105
"		...	5	Northampton Cons.	99 —104
"		10	10	Oxford, Cons. Ord.	160—180
June	18	5⅜	5⅜	Plymouth & Stone Ord.	103—108
"		8½	8½	Do. Addl.	13'—16/-
"		7½	7½	Do. New	13/—15/-
Sept.	17	5	5	Do. 5 p.c. Deb. Perp....	105—115xd
Aug.	20	7½	7½	Portsmouth & Gosport Cons.	133—138
"		5	5	Do. 5 p.c. max.	95—100
Aug.	6	10	10	Preston 'A'	170—190
"		7	7	Do. 'B'	130—135
June	24	46	2	Primitiva Holdings, Ltd. Ord.	10/6—12/6
June	4	...	6	Do. 6½ p.c. Red. Cum. Pref.	97—102
Aug.	20	5	5	Reading, 5 p.c. max.	97—102
June	18	4	4	Do. 4 p.c. Perp. Deb....	95—100
"		...	...	Do. 3¾ p.c. Red. (Non-Cum. Pref....	95—100
Aug.	6	—	5	Romford, Ord.	97—102
Mar.	26	...	4	Do. 4 p.c. Debs. Red....	97—102
Sept.	17	—	7½	Severn Val. Ltd. Ord.	21/—23/-xd
"		4½	4½	Do. 4½ p.c. Cum. Pref.	19/6—21/6xd
Aug.	20	6½	6½	Sheffield Cons....	125—135
July	16	4	4	Do. 4 p.c. Red. Deb.	98—103
Sept.	3	—	6	South East'n Gas Ltd. Ord.	19 —21/-
"		—	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20 6
Feb.	26	4	4	Do. 4 p.c. Irred. Cum. Pref.	18/—20 -
Aug.	6	—	5	South Metropolitan Ord.	85 — 90
"		6	6	Do. 6 p.c. Irred. Pref....	110 —115
"		4	4	Do. 4 p.c. Irred. Pref.	91 — 96
"		3	3	Do. 3 p.c. Perp. Deb.	78 — 83
July	16	5	5	Do. 5 p.c. Red. Deb.	97 —102
Aug.	6	5	5	South Suburban Ord. 5 p.c.	97 —102
"		5	5	Do. 5 p.c. Perp. Pref.	100 —105
"		4	4	Do. 4 p.c. Perp. Pref....	95 —100
"		3½	3½	Do. 3½ p.c. Red. Pref....	97 —102
June	4	5	5	Do. 5 p.c. Perp. Deb....	108 —118
Sept.	17	5½	5½	South West. G. & W. Ltd. Ord.	19/—21/-xd
Aug.	6	5	5	Southampton Ord.	100 —105
Aug.	20	6	6	Sunderland Ord.	113 —118
Aug.	6	—	4½	Swansea Ord.	82 — 87
"		...	5½	Do. 5½ p.c. Red. Pref.	98 —103
Sept.	17	—	7	Swindon Cons. Ord.	113 —118xd
Aug.	6	5	5	Tottenham Ord.	97 —102
"		5	5	Do. 5 p.c. Pref.	100 —105
"		5½	5½	Do. 5½ p.c. Irred. Pref.	110 —115
June	4	4	4	Do. 4 p.c. Perp. Deb....	95 —100
"		7½	7½	Tunbridge Wells, 4 p.c. Sliding	120 —130
"		7	6	U. Kingdom Ltd. Ord.	22/—24 -
May	14	...	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-
"		...	4	Do. 4 p.c. 1st Red. Cum. Pref.... ...	19/—21/-
June	18	4½	4½	Do. 4½ p.c. 2nd Non. Cum. Pf.... ...	19/—21/-
Sept.	17	3½	3½	Do. 3½ p.c. Red. Deb....	95 —100xd
Aug.	6	6⅝	6⅝	Uxbridge, &c., 5 p.c. Cap.	120 —125
"		5	5	Do. 5 p.c. Pref.	100 —105
June	4	5	5	Do. 5 p.c. Perp. Deb.	105 —115
Aug.	6	5	5	Wandsworth Cons.	98 —103
"		4	4	Do. 4 p.c. Pref....	91 — 96
"		5	5	Do. 5 p.c. Irred. Deb....	108 —118
"		4	4	Do. 4 p.c. Irred. Deb....	95 —100
"		5	5	Watford & St. Albans Ord.	97 —102
"		5	5	Do. 5 p.c. Pref.	100 —105
"		5½	5½	Do. 5½ p.c. Pref.	105 —115
"		5	5	Weymouth Ord. (5 p.c. Basic)	95 —100
"		11	11	Woking District "A" Ord....	180 —190
"		7·7	7·7	Do. "B" Ord....	130 —135
Aug.	20	8	8	Wolverhampton Cons. Ord.	123 —128
Sept.	3	5	5	York Cons. Ord.	102 —107xd

GAS UNDERTAKINGS' RESULTS

Dunstable Gas and Water Company—Interim dividends on account of the year ending Dec. 31 next have been declared at the rate of 2½% actual on the 5% Preference stock, 5% actual on the 10% Maximum shares, 3½% actual on the 7% Maximum shares, and 2½% actual on the 5% Maximum shares.

Shrewsbury Gas Light Company.—The 127th annual report records an increase of 10% in gas sales during the year ended June 30. The revenue account shows a profit of £13,610 compared with £32,486 for the previous year, gas sales having yielded £111,695 against £102,532. There was a total of 12,525 consumers at the end of the year, comprising 3,559 ordinary and 8,966 prepayment. A final dividend of 4½% makes a total distribution for the year of 7½% and leaves a balance of £7,343 to be carried forward.

Metropolitan Gas Company of Melbourne.—The published report and accounts confirm the preliminary statement of a final dividend of 5s. per share. From a total revenue of £2,227,474 for the year ended June 30, including £1,802,671 from the sale of gas, a balance of £228,473 was carried to net revenue account. The net profit was £104,983, and the carry-forward was reduced from £97,095 to £35,829. The total make for the year was 7,650 million cu.ft., including 1,889 million cu.ft. of water gas, and total sales were 6,819 million cu.ft.

Coatbridge Gas Company.—Interim dividends at 5% actual on the Original stock and 3½% actual on New shares were declared in February, and at the annual meeting on Sept. 16 final dividends were confirmed at the rate of 9¼% and £6 9s. 6d.% respectively. The Directors reported that sales of gas for the year ended June 30 were satisfactory, and the works and plant had been maintained in an efficient state of repair. The balance carried to profit and loss account was £15,618, and after payment of dividends there was a balance of £10,692 to be carried forward, compared with £10,799 brought in.

Clitheroe Gas Department.—Mr. R. W. Harris, Engineer and Manager, reports a net profit on the year of £1,827 against £498 in 1946. Receipts were £32,440, a decrease of £18. The revenue from residuals was £21,999 against £22,759 last year. Gas manufactured showed a decline of 6,787,300 cu.ft., the total being 162,068,000 cu.ft. Manufacture of benzole amounted to 24,369 gall., against 33,443 gall. last year. Showroom sales increased considerably, being £3,519 against £2,482. Hire purchase sales rose from £151 to £308. The charges for gas were increased on April 1 by ½d. per therm, and discounts on ordinary meters abolished.

Middleton Gas Department.—Mr. H. D. Robinson, Engineer and Manager, reports a gross profit of £13,227 for the year ended Mar. 31, compared with £9,591 for the previous year, and a net profit of £5,725 against £2,316. Gas manufactured totalled 351,007,000 cu.ft., an increase of 19.05%. The maximum day's consumption was 1,604,000 cu.ft. on Mar. 13, compared with the previous record of 1,177,000 cu.ft. on Jan. 22, 1946. The percentage of unaccounted-for gas was reduced from 5.92 to 4.65. In spite of increased costs the price of gas remained unchanged, and the net profit was the highest in the history of the undertaking. Gas sales showed an increase of 20%, accounted for principally by domestic consumers and the bulk supply of 6,975,000 cu.ft. of gas to Manchester. Work has been started on the installation of a waste heat boiler and water softening plant, and orders have been placed for new condensers, electro-detarrer, purifier extensions and a new four-lift spiral guided gasholder.

Motherwell and Wishaw Gas Department.—Total gas produced for the year ended May 15, according to Mr. William Kirk, Engineer and Manager, amounted to 685,920,000 cu.ft., an increase of 32,652,000 cu.ft. Gas sold amounted to 633,677,400 cu.ft., an increase of 34,937,600 cu.ft. Coal carbonized was 35,794 tons at a gross cost of 43s. 3.17d. per ton. Despite an increase in the supply of gas appliances during the year the demand still far exceeded supply. Hire purchase was resumed and agreements negotiated to a value of £4,000. The report indicates a deterioration in quality of coal consumed during the year, but points out that the average price paid was 7d. less per ton than in the previous year. There are now 17,000 consumers, of whom no less than 80% have prepayment meters. A record output of gas was achieved on Feb. 3 with 2,541,000 cu.ft., setting up a new record for the Department.

Paisley Gas Department.—Mr. J. M. Dow, Engineer and Manager, reports a gross profit of £33,701 and a net profit of £6,196 for the year ended May 15. The total make of gas reached 1,013,880,000 cu.ft., an increase of 8.49% over the previous year. The maximum daily output, recorded on Jan. 31, was 3,873,000 cu.ft., a new record for the undertaking and 8.27% above the previous record. Unaccounted-for gas at 2.61% was considerably better than the previous year's figure of 3.55%. Scarcity of appliances, coupled with the continued suspension of hire purchase facilities, restricted the amount of business done through the showrooms; nevertheless 1,159 appliances were sold against 826 for the previous year. The value of gas sold amounted to £13,610 compared with £9,115. During the year schemes for the re-introduction of simple hire and sale by hire purchase of gas appliances were approved by the Gas Committee, and it is hoped that the Scottish Home Department's approval will be forthcoming so that the schemes can be put into operation at an early date. New costing and store record systems were introduced during the year, and progress was made on new carbonizing plant, which it is hoped will be in use by the coming winter.

COMPANY NEWS

United Gas Industries, Ltd.—The report and accounts for the year ended Mar. 31 show a consolidated profit for the group, before charging depreciation and taxation and after crediting over-provisions in previous years, of £419,165, compared with £327,933 for the previous year. The aggregate net profit was £152,560 against £101,980. Deducting £13,176 profits retained by subsidiary companies, the net profit of United Gas Industries, Ltd., was £139,384. The balance carried forward is £29,121 against £25,953. The Directors propose a final dividend, less tax, of 12% on the Ordinary shares, making 17% for the year, and a dividend of 1s. 9d. per share on the Deferred shares. The dividends for the previous year were 12% and 6d. per share respectively, less tax. It is also proposed to transfer £25,000 to general reserve account. The Directors are hoping to inaugurate a staff pension fund and propose setting aside out of the general reserve an initial contribution of £20,000. Provision has been made for depreciation of the assets of the Company and also of the assets of the subsidiary companies in the accounts of those companies, and in addition special depreciation has been provided at a figure of £24,000.

GAS PRODUCTS PRICES

The London Market

September 26

There are no changes to report in the prices of coal tar products.

The Provinces

September 27

Average prices for gas-works products this week are: Pitch, 75s. per ton; toluole, naked, North, 90's, 2s. 4d. to 2s. 6¾d. per gall.; pure, 3s. 2¾d. Prices for carbolic acid 60's anthracene, creosote, oil (hydrogenation), coal tar oils (timber preservation, &c.) and strained anthracene oil are controlled by Government Orders. Prices for road tar are increased by one penny per gall. by S. R. & O. 1947, 177.

Scotland

September 27

Throughput is well maintained.

Refined tar.* Yield to the distiller is 6d. per gall. ex works, naked. Creosote oil. Timber preserving quality,* 5½d. to 6½d. per gall.; hydrogenation oil,* 5¾d. per gall.; low gravity or virgin oil,† 7½d. to 7¾d. per gall.; benzol absorbing oil, 6½d. to 8d. per gall. Refined cresylic acid is 3s. 6d. to 4s. 6d. per gall. ex works, naked, according to quality. Crude naphtha,† 8d. to 10d. per gall. Solvent naphtha.* Basic maximum prices delivered in bulk, 90/160 grade 2s. 10d. per gall, and 90/190 heavy naphtha, unrectified 2s. 0½d. per gall, rectified 2s. 4d. per gall. Pyridine, †90/160 grade 15s. per gall., and 90/140 grade 17s. per gall.

* Price controlled. † Uncontrolled.

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